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RESEARCH REPORTS -- PUBLISHING  
AT WHAT COST AND QUALITY?

by

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RESEARCH REPORTS --  
PUBLISHING AT WHAT COST AND QUALITY?

S. Sreenivas Rao and U.K. Srivastava

Two major characteristics of research reports pose problems in publishing -- a) small market (usually between 500 to 1,000 copies or sometime even less) and b) greater use of mathematical symbols, tables, and illustrative materials like drawings, charts, and graphs. These characteristics make regular publishers, who are interested in profitable ventures like text books with 2,000 circulation or more, shy away from publishing of research reports. They find the publishing of research reports a costly, difficult, and time consuming venture.

However, publication of research reports cannot be avoided. With nearly 200 institutions of higher learning/research and research sponsoring organizations in the country, there is an ever growing need for publishing research reports. Though one may question the quality of some of the research reports, it will be difficult to generate new ideas in specialized fields without a free flow of such publications. A striking difference between the developed countries and the underdeveloped ones is the easy availability of such reports on numerous and varied subjects in the former and non-availability in the latter.

Therefore, the usual choice for educational/research institutions is to publish the research reports on their own. A publications department has become an essential extension of modern day education.

But with the increasing cost of reproduction in recent years, oft-discussed questions in publishing research reports are:

1. In what form to publish so that the reproduction is a) fast, b) accurate, c) presentable (getup and readability), and d) inexpensive?
2. What reproduction methods are available and what mix can be used to satisfy the four criteria indicated above?
3. What type of reproduction unit should be developed in an educational/research institution?

This paper examines these questions on the basis of an experience of an educational institution which has the following reproduction facilities: duplication, scanner (automatic stencil cutting machine), photocopying machine, baby offset, and platemaking equipment. The institution gets its letterpress work done outside. This paper also presents a way of analysing the reproduction problems in educational institutions and other similar size organizations.

#### Reproduction Choices Available

Once a neat and clean typed copy is available, the following reproduction choices are available for research reports in India:

1. Duplication:
  - a) Retype the matter on the stencil
  - b) Mechanically transfer the matter to the stencil on a scanner machine. (Particularly useful for mathematical symbols, tables, and illustrative materials)

2. Baby Offset: a) Prepare metal plates through a photocopier.  
 b) Prepare metal plates through the regular negative-making process.

(In India, paper masters or lithomasters at present cost the same or more than the metal masters. But, unlike the metal masters, they are not good for storage and repeat runs if needed.)

3. Letterpress: Blocks have to be made for illustrative materials. Sometimes blocks have to be prepared for pages or large portions with mathematical symbols because most of the medium and small presses in India do not have the complete range and quality of mathematical symbols.

#### Ranking of the Reproduction Choices

The reproduction choices can be differentiated by ranking them on a) speed, b) accuracy, and c) presentation. (See Exhibit 1).

Speed becomes important in some cases because of the topicality of the subject, the need for the report's data for further research, and other time constraints like discussion at a conference or a seminar. Accuracy is important to the authors to maintain their credibility in the field and for the readers to make further use of the data. Finally, the presentation reflects the image of the institution and the author.

In ranking speed, both the shorter processing time and the operational ease have been rated high. On accuracy, the mechanical transference processes have been considered to be better than non-mechanical processes. Greater the need for qualified proofreading, the more difficult it is to maintain accuracy. Moreover, non-mechanical transferences tend to reduce the speed. In ranking presentation, availability of mechanical reduction and enlargement facility has been rated high.

Finally the ranking\* (shown in Exhibit 1) has been done in the ascending order on a scale of 1 to 5. The highest number indicates that the process for that criterion is the best. Moreover, to indicate the suitability of each material to a given process, a distinction among text, tables, and illustrations has been made.

On the basis of speed, accuracy, and presentation, the overall ranking among the choices is as follows:

1. Baby offset (plates made through negative)	37
2. Baby offset (plates made through photocopier)	35
3. Duplicating through scanner stencil	35
4. Letterpress	31
5. Letterpress + Baby offset (Plates made through negatives)	31
6. Letterpress + Baby offset (plate made through photocopier)	30
7. Duplicating through manual stencil cutting	19

The first three processes score very high on speed and accuracy because they are based on automatic transference of the copy. The next three processes, however, score high on presentation. The last process loses on all the three criteria, but it is the most commonly used one in the country. Is duplicating, though the least preferable alternative on qualitative criteria, used so often because it is the cheapest of alternatives? Let us examine the costs of various choices.

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\*It may be noted that the initial judgement in any ranking is subjective based on one's experience. The judgement used here on the basis of technical knowledge of reproduction machines and processes and as experienced at an educational institution.

### Costs of Various Choices

To compare the costs of various choices, a manuscript of 250 pages typed in double space was used as an example. The breakup of the pages was assumed as follows: 150 pages of text; 75 pages of tables; and 25 pages of illustrations. It was further assumed that the final reproduction, if done through duplication or offset, will be done in double space on typewriter for better readability. For easier comparison, the ream size of paper was assumed as 500 sheets of 8½ x 11 inches sheet size. The quality of paper was assumed to be of middle order in both duplicating and non-duplicating processes. The calculations have been done for 500 copies and 1,000 copies.

In calculating the reproduction costs, the following assumptions in the differences among the duplication, offset, and letterpress processes have been made:

1. The stencil usually lasts up to 500 copies.
2. In offset, only the tables and illustrative materials can be reduced in size significantly but not the text portion.
3. In letterpress, text, tables, and illustrative materials can be reduced in size and can make a significant reduction in paper consumption.
4. The quality of proofreading required in letterpress printing is more than in duplicating process.

The relevant reproduction costs of the following seven choices are given in Exhibit 2: duplication (manual typing of stencil), duplication (scanner stencil), baby offset (plate made through a photocopier), baby offset (plate made through regular negative process), letterpress, letterpress plus baby offset (plate through photocopier), and letterpress plus baby offset (plate through negative). The last two combination alternatives -- printing the text and tables by letterpress and illustrations by offset are technically feasible.

The ranking of the alternatives in ascending order of cost for 500 copies is as follows:

1. Baby Offset (plate made through a photocopier)	Rs. 4,432
2. Duplicating (scanner stencil cutting)	Rs. 4,800
3. Duplicating (manual stencil cutting)	Rs. 4,887
4. Letterpress + babyoffset (photocopier)	Rs. 6,419
5. Letterpress + babyoffset (plate made through negatives)	Rs. 6,663
6. Letterpress	Rs. 7,375
7. Offset (negative)	Rs. 9,000

The ranking in ascending order of cost for 1,000 copies is as follows:

1. Letterpress + Baby offset (plate made through a photocopier)	Rs. 7,739
2. Letterpress + Baby offset (plate made through a negative)	Rs. 7,983
3. Baby offset (plate made through a photocopier)	Rs. 8,032
4. Letterpress	Rs. 8,695
5. Duplication (stencil cut by a scanner)	Rs. 9,600
6. Duplication (manual typing of the stencil)	Rs. 9,775
7. Baby offset (plates made through regular negatives)	Rs. 12,600

This ranking is likely to hold good in most parts of India for two reasons. First, since most of the reproduction materials are sold by nation-wide companies, the prices are likely to be the same (with marginal variations in the distributors' commission, transportation charges, and sales tax). Second, any increase or decrease in manual costs, say in composition costs in letterpress, in a city are likely to show corresponding increase or decrease in other manual costs, like typing charges in another alternative.



### Manuscript with Photographs

If a manuscript contains substantial number of pages of photographs, the reproduction choices available for this portion are offset (through negatives) and letterpress. In this case, irrespective of the number of copies to be produced, baby offset will be cheaper than letterpress because platemaking is cheaper than blockmaking, which is required for letterpress printing. The paper consumption and printing charges will be the same in both the alternatives.

### Low Quality and High Cost

Why do most educational/research institutions produce mimeographed monographs? There could be three possible reasons. First, their circulation maybe 500 or less copies in which case duplication is cheaper. Second, the baby offset machines have come to be produced in the country only recently and most institutions have not yet caught on with these machines. The essential component of this technology -- the electric typewriter -- has not yet been marketed in large scale. Third, the initial capital investment to build a good reproduction unit is much larger than that of a duplicating unit.

Hopefully, in the next five to six years there will be more manufacturers of baby offset machines in the country and the production of the electric typewriters will catch on. But let us examine whether the initial capital investment for building a more modern reproduction unit for educational/research institutions is so exorbitant as it appears.

The initial capital investment at the present rates will be somewhat as follows:

Scanning machine (1)	=	Rs. 20,000
Baby offset (10 x 15) (1)	=	40,000
Platemaking equipment (1)	=	10,000
Electric typewriter (1)	=	10,000
Photocopying machine (1)	=	<u>25,000</u>
Total		Rs. 1,05,000

The cost difference per report (with 1,000 copies circulation) between the present duplication and a combination of letterpress plus baby offset will be Rs. 2036. Therefore, the initial investment of Rs. 1,05,000 can be paid off over 52 reports. In other words, if the institution produced about 10 reports a year, the payback period will be five years. The life of these machines can be assumed to be 10 years. The maintenance and manpower costs have been found more or less equal in all alternatives except for letterpress. Moreover, these machines could be used in other mixes when speed and accuracy becomes more important than the other two criteria for any given report. Some of these machines can be also used for other functions like photocopying five or six copies. So the actual payback period will be less than five years.

#### Distribution and Pricing of Research Monographs

A disadvantage that the educational institutions suffer from mimeographed publications is their inability to charge higher price because of the low presentation quality as against a printed monograph. If a bulky and unwieldy duplicated monograph can be sold for Rs. 15, the same material can be sold for Rs. 25 in a much more presentable and readable paperback edition.

Moreover, a printed monograph carries greater credibility than a duplicated one. Even the authors are willing to put in effort to make the manuscript more accurate and readable if it were to be printed than duplicated. For seeing their name in print, the authors are also willing to subject themselves to some sort of selectivity in publishing. In the long run, better production quality may lead to better quality in substance.

The economics of marketing the monographs under different possible prices for different choices of reproduction are given in Exhibit 3. From this exhibit the following conclusions can be drawn:

1. The revenue generating alternatives in the descending order are as follows:
  - a. Letterpress + offset (photocopying process)
  - b. Letterpress + offset (negative process)
  - c. Letterpress
  - d. Offset (negative process)
  - e. Offset (photocopying process)

2. Breakeven is less than 500 for the mixed alternatives and letterpress. But for duplication and offset (photocopying process), which are cheaper at 500 copies production, the breakeven is more than 500. Therefore, the commonly used duplication is a loss proposition when both production cost and pricing ability are considered.

### Conclusions

By using a better reproduction technology than duplication and by having a judicious mix of alternatives, an educational/research institution can produce better research reports than it does now and that too at a lesser cost.

Better marketing and pricing of the reports will not only recoup the initial investment but will also help in at least not losing money. Hopefully, better presentation and larger dissemination will provide an incentive to the researchers to improve the substantive quality of their output. Another contribution is the easing of the pressure on the demand for paper, which is of some national significance.

The four criteria - speed, accuracy, presentability, and cost - on which the mix of reproduction technology is justified are relevant to other organizations like government and business offices. The use of mixed technology by other organizations also will have substantial impact on reducing the demand on paper. However, the four criteria could be better satisfied if supervisors of reproduction units, communication specialists, and layout artists constantly apply these criteria to each job on hand.

The strategy of mixed technology will get a boost if the Indian manufacturers can fill up two gaps that exist in using such mixture. The first gap can be filled by increased production, sales, and servicing of electric typewriters. If at a later stage, varitypewriters and justowriters could be introduced, it would be a boon for small institutions which cannot incur heavy initial capital costs of having hot metal composition, and large organizations like the government and business offices, which cannot go in for outside composition for reasons of confidentiality and speed. The other gap can be filled in by producing automatic plate transference equipment for linking the chain in the process of transferring images from paper to metal masters for use on baby offset machines.

Exhibit 1: Ranking of the Reproduction Choices

	Text		Tables		Illustrations		Total Score
	Speed	Accuracy	Speed	Accuracy	Speed	Accuracy	
Duplicating Manual stencil cutting	2	3	3	2	1	1	19
Scanner stencil	5	5	2	2	5	1	35
Baby Offset 1. Photo copying plate	4	5	2	3	4	5	35
Baby Offset 2. Regular negative plate	3	5	4	5	3	5	37
Letter Press	1	3	5	3	1	3	31
Letter Press + Baby offset (1)	1	3	5	3	1	4	30
Letter Press + Baby offset (2)	1	3	5	3	1	3	31

Exhibit 2: Costs of Various Choices

	<u>500 copies</u>	<u>1,000 copies</u>
1. <u>Duplication</u> (manual typing of stencil)		
Stencil (250 stencils x Rs. 1.25)	312.50	625.00
Typing and correcting (250 stencils x Rs.1.50)	375.00	750.00
Draughtsman (for illustrations)	150.00	300.00
Proofreading (clerical)	250.00	500.00
Paper--duplicated on both sides of the sheet (255 reams x Rs. 20).		
Adjustment made for wastage at 2%	2,550.00	5,100.00
Duplicating (1 paise per page per copy)	1,250.00	2,500.00
Total Rs.	<u>4,887.50</u>	<u>9,775.00</u>
2. <u>Duplication</u> (Scanner stencil)		
Stencil (250 stencils x Rs. 4) includes operating costs	1,000.00	2,000.00
Paper--(Same as in 1)	2,550.00	5,100.00
Duplicating (Same as in 1)	1,250.00	2,500.00
Total Rs.	<u>4,800.00</u>	<u>9,600.00</u>
3. <u>Baby offset</u> (Plate made through a photocopier)		
Plates (225 plates x Rs. 3) (adj. made for reduction of illustrations and tables)	675.00	675.00
Platemaking (225 plates x 75 paise)	157.50	157.50
Paper--printed on both sides of the sheet (235 reams x Rs. 20).		
Adjustment made for wastage at 5%	2,350.00	4,700.00
Printing (same as in 1)	1,250.00	2,500.00
Total Rs.	<u>4,432.50</u>	<u>8,032.50</u>
4. <u>Baby offset</u> (Plate made through regular negative)		
Plates (225 plates x Rs. 3)	675.00	675.00
Negatives (225 negatives x 20)	4,500.00	4,500.00
Platemaking (225 plates x Re.1)	225.00	225.00
Paper--printed on both sides of the sheet (235 reams x Rs. 20). Adjustment made for wastage at 5%	2,350.00	4,700.00
Printing (same as in 1)	1,250.00	2,500.00
Total Rs.	<u>9,000.00</u>	<u>12,600.00</u>

5. Letterpress

Composition (10 pt. for the text) (75 pages x Rs. 25) (accounted for reduction)	1,875.00	1,875.00
Composition (8 pt. for the tables) (40 pages x Rs. 35) (accounted for reduction)	1,400.00	1,400.00
Blockmaking (for illustrations)	1,000.00	1,000.00
Proofreading (regular)	500.00	500.00
Paper (132 reams x Rs. 20)	1,320.00	2,640.00
Printing (128 pages x Rs. 10)	1,280.00	1,280.00
Total Rs.	<u>7,375.00</u>	<u>8,695.00</u>

6. Letterpress + Baby Offset (Plate made through a photocopier)

Composition of text (Same as in 5)	1,875.00	1,875.00
Composition of tables (Same as in 5)	1,400.00	1,400.00
Plates for 25 pages of illustrations after reduction (12 plates x Rs. 24)	44.40	44.00
Proofreading (regular)	500.00	500.00
Paper (132 reams x Rs. 20)	1,320.00	2,640.00
Printing (128pp. x Rs. 10)	<u>1,280.00</u>	<u>1,280.00</u>
Total Rs.	<u>6,419.40</u>	<u>7,739.40</u>

7. Letterpress + Baby Offset (Plates made through regular negative)

Composition of text (Same as in 5)	1,875.00	1,875.00
Composition of tables (Same as in 5)	1,400.00	1,400.00
Plates for 25 pages of illustrations after reduction (12 plates x Rs. 24)	288.00	288.00
Proofreading (regular)	500.00	500.00
Paper (132 reams x Rs. 20)	1,320.00	2,640.00
Printing (128 pp. x Rs. 10)	1,280.00	1,280.00
Total Rs.	<u>6,663.00</u>	<u>7,983.00</u>

Exhibit 3: Breakeven Analysis

Reproduction Choices	Production Cost* Fixed Variable	Distribution Cost Fixed Variable	Assumed Price	Contribution per copy	Breakeven (No. of copies)	Income on sales or 1000 copies rounded off to the nearest rupee
Letterpress + Offset (plate through photo-copier)	5099.40 2.64	1,000 2.50	25	19.86	308	13,743
Letterpress Offset (plate through negative)	5343 2.64	1,000 2.50	25	19.86	320	13,505
Offset (plate through photo-copier)	832.50 7.20	1,000 5	15	2.80	655	966
Letterpress	6825 2.64	1,000 2.50	25	19.86	395	12,015
Duplication (Scanner stencil)	2000 7.60	1,000 5	15	2.40	1250	(-600)
Duplication (Manual stencil cutting)	2175 7.60	1,000 5	15	2.40	1323	(-775)
Offset (Plate through negative)	5400 7.20	1,000 5	25	12.80	500	6,400

\* Paper and printing costs have been treated as variable costs in all alternatives. But printing cost in letterpress operation or a combination of it has been treated as fixed cost because of normal fixed charges for printing up to 1,000 copies.