Management Science

Case study evaluation

Case: Textbook Publishing

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## Introduction

ASW Publishers are considering the strategies for publishing books next year. They have provided a list of 10 books out of which 3 books are listed as Revision and 7 are new prints. The contracts for Revision books has already been signed and they are to be published as new editions in the following year.

|  |  |  |
| --- | --- | --- |
| Book Subject | Type | 3 year Projected Sales (in 1000's $) |
| Business Calculus | New | 20 |
| Finite Mathematics | Revision | 30 |
| General Statistics | New | 15 |
| Mathematical statistics | New | 10 |
| Business Statistics | Revision | 25 |
| Finance | New | 18 |
| Financial accounting | New | 25 |
| Managerial accounting | Revision | 50 |
| English Literature | New | 20 |
| German | New | 30 |

There are 3 employees that the publication house is to employ in order to opt for the most beneficial strategy and optimal resource allocation in order to complete projects. John has 60 days, Susan has 40 days and Monica has 40 days which has to be allocated in the most optimal manner.

## Objective and Assumptions

The objective in this case has been assumed to be sales maximization. It is assumed that the publication house would allocate available resources for the purpose of achieving maximum sales.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
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| General Statistics | New | 15 |  | 24 | 0 | 30 |
| Mathematical statistics | New | 10 |  | 20 | 0 | 24 |
| Business Statistics | Revision | 25 |  | 10 | 0 | 16 |
| Finance | New | 18 |  | 0 | 0 | 14 |
| Financial accounting | New | 25 |  | 0 | 24 | 26 |
| Managerial accounting | Revision | 50 |  | 0 | 28 | 30 |
| English Literature | New | 20 |  | 40 | 34 | 30 |
| German | New | 30 |  | 0 | 50 | 36 |
|  |  |  |  |  |  |  |
|  |  |  | Totals | 60 | 40 | 40 |

Objective

Maximize Z = x1 + x 2 + x 3...... Max sales subject to

Constraints

J1 + J2 + J3+.... ≤ 60

S1+S2+S3+.... ≤ 40

M1+M2+M3+.... ≤ 40

where in J is the total number of days available with John

S is the total number of days available with Susan

M is the total number of days available with Monica

Additional conditions and assumptions

ASW will not publish more than 2 statistics books in a single year

ASW will not publish more than 1 accounting book in a single year

ASW will publish one of the mathematics book but not both in a single year

## Analysis based on model

|  |  |  |  |  |  |  |
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|  |  |  | Totals | 60 | 40 | 40 |

Solution 1: Z = 50

J = 0

S = 28

M = 30

Does not satisfy the constraint of at least 1 mathematics book being published

|  |  |  |  |  |  |  |
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|  |  |  | Totals | 60 | 40 | 40 |
|  |  |  |  |  |  |  |
|  |  |  |  |  | 12 | 10 |

Solution 2: Z = 45

J = 40

S = 24

M = 30

Satisfies all conditions and constraints

|  |  |  |  |  |  |  |
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Solution 3 : Z = 63

J = 40

S = 40

M = 30

Satisfies all conditions and constraints

|  |  |  |  |  |  |  |
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Solution 3 : Z = 73

J = 26

S = 24

M = 30

Satisfies all conditions and constraints and gives maximum sales thus being the optimal solution

## Recommendations

(1) What is the best publication strategy, that is which books should be published next year? What is the total number of books published?

The best publication strategy for ASW, based on the usage of simplex model method for solving of linear programming method, is the combination of Finite mathematics, business statistics and finance books. This combination of 3 books being published results in maximum sales of $ 73,000.

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Solution 3 : Z = 73

J = 26

S = 24

M = 30

Satisfies all conditions and constraints and gives maximum sales thus being the optimal solution

As John has only 60 days and Susan and Monica have 40 days each, the optimal solution of maximizing sales consists of publishing 2 revision books and 1 New book. Moreover the conditions of publishing 1 statistics book, 1 mathematics book and 1 book in finance is also fully satisfied.

The only issue for the management is that the revision of managerial accounting book will have to be delayed by a year in order to ensure that they obtain maximum sales. The expected sales of managerial accounting is quite high, but at the same time, the resources or man days required by the project is also extremely high. So, it is recommended that there be a delay in publishing the revised edition of managerial accounting and publication be done for Finite mathematics, business statistics and finance books as this would be the best strategy for the firm.

(2) Would you recommend that Susan be moved off another project to allow her to work 12 more days? How about John or Monica? Management does not like any proposed solution that does not include at least one new book and so you may need to add some more constraint(s) when trying to answer this question.

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Z = 80

J = 16

S = 52

M = 30

In this situation where Susan is moved from another project and can get 12 more days to work,

S ≤ 52. The opted solution optimizes sales to $80,000 and helps increase sales, thus making it profitable and viable to move Susan from another project and opting for a combination of Finite Mathematics and Managerial accounting for publication. But the second constraint that the management requires at least 1 new book to be published is not fulfilled as both the books are revision types. This makes it viable only to stick to the previously calculated optimal solution with Z = 73 or sales being $73,000.

In case of moving John alone, Susan and Monica do not have sufficient days to work on other projects. Monica has just 10 days left which are not sufficient for any of the remaining book publications projects. Susan would need an additional 34 hours in order to work on another project. Since at least 2 people are required to work on all book publications except Finance, moving John or Monica would not be beneficial to the firm and no additional projects can be taken up or completed within the given constraints.

## Conclusion

As John has only 60 days and Susan and Monica have 40 days each, the optimal solution of maximizing sales consists of publishing 2 revision books and 1 New book. Moreover the conditions of publishing 1 statistics book, 1 mathematics book and 1 book in finance is also fully satisfied.

The best publication strategy for ASW, based on the usage of simplex model method for solving of linear programming method, is the combination of Finite mathematics, business statistics and finance books. This combination of 3 books being published results in maximum sales of $ 73,000.

The only issue for the management is that the revision of managerial accounting book will have to be delayed by a year in order to ensure that they obtain maximum sales. The expected sales of managerial accounting is quite high, but at the same time, the resources or man days required by the project is also extremely high.

So, it is recommended that there be a delay in publishing the revised edition of managerial accounting and publication be done for Finite mathematics, business statistics and finance books as this would be the best strategy for the firm.

## Appendix

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Solution 1: Z = 50

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Does not satisfy the constraint of at least 1 mathematics book being published

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