weigh intangible considerations that cannot be incorporated into the model. It took me awhile to learn these lessons back when I was vice president for marketing. I'm sure you'll get the hang of it quicker than I did. You're on the right track now.

Claire: Thanks for all the good advice. I'll get back to work and report to you again soon.

We will pick up this story again in Section 4.5.

Review Questions

1. What is the problem being addressed in this case study?
2. What overall measure of performance is being used?
3. Why is David Sloan concerned about the plan recommended by the linear programming spreadsheet model?
4. What are the assumptions of linear programming that need to be checked to evaluate the adequacy of using a linear programming model to represent the problem under consideration?

4.2   RESOURCE-ALLOCATION PROBLEMS

In the opening paragraph of Chapter 2, we described managerial problems involving the allocation of an organization's resources to its various productive activities. Those were *resource-allocation* problems.

> **Resource-allocation problems** are linear programming problems involving the *allocation of resources to activities*. The *identifying feature* for any such problem is that each functional constraint in the linear programming model is a **resource constraint,** which has the form,
>
> Amount of resource used ≤ Amount of resource available
>
> for one of the resources.

The amount of a resource used depends on which activities are undertaken, the levels of those activities, and how heavily those activities need to use the resource. Thus, the resource constraints place limits on the levels of the activities. The objective is to choose the levels of the activities so as to maximize some overall measure of performance (such as total profit) from the activities while satisfying all the resource constraints.

Beginning with the case study and then the familiar Wyndor Glass Co. product-mix problem, we will look at three examples that illustrate the characteristics of resource-allocation problems. These examples also demonstrate how this type of problem can arise in a variety of contexts.

The Super Grain Corp. Advertising-Mix Problem

The linear programming model formulated in Section 4.1 for the Super Grain case study is one example of a resource-allocation problem. The three *activities* under consideration are the advertising in the three types of media chosen by Giacomi & Jackowitz.

Activity 1:   TV commercials

Activity 2:   Magazine ads

Activity 3:   Sunday ads

An initial step in formulating any resource-allocation problem is to identify the activities and the resources.

The decisions being made are the *levels* of these activities, that is, the *number* of TV commercials, magazine ads, and Sunday ads to run.

The *resources* to be allocated to these activities are

Resource 1: Advertising budget ($4 million)

Resource 2: Planning budget ($1 million)

Resource 3: TV spots available for different commercials (5)