Chapter 9

PLANNING TOOLS AND TECHNIQUES
Learning Objectives

You should learn to:

– Describe three techniques for assessing the environment
– Describe four techniques for allocating resources
– Tell why budgets are popular planning tools
– Differentiate Gantt and load charts
– Identify the steps in developing a PERT network
Learning Objectives (cont.)

You should learn to:

– Describe the requirements for using linear programming
– Explain the concept of project planning
– Tell how managers might use scenarios in planning
Techniques For Assessing The Environment

Environmental Scanning

• the screening of information to anticipate and interpret changes in the environment. It helps organizations to develop their strategies accordingly.

• *competitor intelligence* - gathering information about one’s competitors.

• It helps to answer may questions: who are competitors? What are they doing?

• a variety of sources of information is easily accessible

• *reverse engineering* - analyze a competitor’s product

• becomes illegal corporate spying when proprietary or ownership materials or trade secrets are stolen

• fine line between what is *legal and ethical* and what is *legal but unethical*

• *internet opened vast sources of data.*
Assessing The Environment (cont.)

Environmental Scanning (cont.)

*global scanning* - screening of information on global forces that might affect an organization that has global interests.

It requires more extensive procedures than those used for scanning the domestic environment.

It might require subscription in different international journals, information basis, periodicals.
Assessing The Environment (cont.)

Forecasting used to predict future events to facilitate decision making

- **Techniques**
- **quantitative** - applies a set of mathematical rules to a series of past data to predict outcomes
- **qualitative** - uses the judgment and opinions of knowledgeable individuals to predict outcomes
- **collaborative forecasting and replenishment (CFAR). Internet software**

- standardized way for businesses to use the Internet to exchange data
- information used to calculate a demand forecast for a particular product. It is based on past sales trends, promotion plans and others of the company.

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## Forecasting Techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantitative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time series analysis</td>
<td>Fits a trend line to a mathematical equation and projects into the future</td>
<td>Predicting next quarter’s sales on the basis of four years of previous</td>
</tr>
<tr>
<td></td>
<td>by means of this equation</td>
<td>sales data</td>
</tr>
<tr>
<td>Regression models</td>
<td>Predicts one variable on the basis of known or assumed other variables</td>
<td>Seeking factors that will predict a certain level of sales (for example,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>price, advertising expenditures)</td>
</tr>
<tr>
<td>Econometric models</td>
<td>Uses a set of regression equations to simulate segments of the economy</td>
<td>Predicting change in car sales as a result of changes in tax laws</td>
</tr>
<tr>
<td>Economic indicators</td>
<td>Uses one or more economic indicators to predict a future state of the economy</td>
<td>Using change in GDP to predict discretionary income</td>
</tr>
<tr>
<td>Substitution effect</td>
<td>Uses a mathematical formula to predict how, when, and under what circumstances a new product or technology will replace an existing one</td>
<td>Predicting the effect of microwave ovens on the sale of conventional ovens</td>
</tr>
<tr>
<td><strong>Qualitative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jury of opinion</td>
<td>Combines and averages the opinions of experts</td>
<td>Polling all the company’s human resource managers to predict next year’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>college recruitment needs</td>
</tr>
<tr>
<td>Salesforce composition</td>
<td>Combines estimates from field sales personnel of customers’ expected</td>
<td>Predicting next year’s sales of industrial lasers</td>
</tr>
<tr>
<td></td>
<td>purchases</td>
<td></td>
</tr>
<tr>
<td>Customer evaluation</td>
<td>Combines estimates from established purchases</td>
<td>Surveying major dealers by a car manufacturer to determine types and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>quantities of products desired</td>
</tr>
</tbody>
</table>
Effectiveness - managers have had mixed success.

- Forecasts are most accurate in relatively stable environments.
- Forecasts are relatively ineffective in predicting non-seasonal events, unusual occurrences, and the actions of competitors.
- To improve forecasts –
  1. use simple forecasting methods.
  2. compare every forecast with “no change”.
  3. use several forecasting methods and get the average
  4. shorten the length of forecasts.
  5. practice forecasting for training
Benchmarking

Benchmarking is the search for the best practices among competitors or non-competitors that lead to their superior performance.

• The benchmarking process typically follows four steps. (See Exhibit 9.2 on p. 230.)

a. A benchmarking planning team is formed. The team’s initial task is to identify what is to be benchmarked, identify comparative organizations, and determine data collection methods.

b. The team collects internal and external data.

c. The data is analyzed to identify performance gaps and to determine the cause of the difference.

d. An action plan is prepared and implemented.

2. Exhibit 9.3 on p. 230 lists some suggestions for improving benchmarking efforts.
Steps In Benchmarking

1. Form a benchmarking planning team
2. Gather internal and external data
3. Prepare and implement action plan
4. Analyze data to identify performance gaps
Suggestions for improving benchmarking

1. Link benchmarking efforts with strategic objectives.
2. Have the right size team - 6-8 persons.
3. Involve those people who will be directly affected by the benchmarking.
4. Focus on specific targeted issues rather than broad.
5. Set realistic timetable.
Techniques For Allocating Resources

Resources

• the assets of the organization
• take many forms, including financial, physical, human, intangible, and structural.

• Techniques for allocation:
  1. Budgeting
  2. Scheduling
  3. Breakeven analysis
  4. Linear programming
Techniques For Allocating Resources

First: Budgeting

Budgets - numerical plans for allocating resources to specific activities

• are prepared for revenues, expenses, and large capital expenditures

• are applicable to a wide variety of organizations and activities

• force financial discipline
four different types of budgets

1. A **revenue budget** is a budget that projects future sales.

2. An **expense budget** is a budget that lists the primary activities undertaken by a unit and allocates a dollar amount to each.

3. A **profit budget** is a budget used by separate units of an organization that combines revenues and expense budgets to determine the unit’s profit contribution.

4. A **cash budget** is a budget that forecasts how much cash an organization will have on hand and how much it will need to meet expenses.

2. These budgets are based on the assumption of a single specified volume—**fixed budgets**. However, volume can’t be predicted exactly. Therefore, a **variable budget** is a budget that takes into account the costs that vary with volume.

3. Managers can improve their budgeting effectiveness by following the suggestions in Exhibit 9.5 on p. 232.
Suggestions For Improving Budgeting

1. Be flexible.

2. Goals should drive budgets -- budgets should not determine goals.

3. Coordinate budgeting throughout the organization.

4. Use budgeting/planning software when appropriate.

5. Remember that budgets are tools.

6. Remember that profits result from smart management, not because you budgeted for them.
Techniques For Allocating Resources (cont.)

Second: Scheduling
detailing what activities have to be done, the order in which they are to be completed, who is to do each, and when they are to be completed

– *Gantt Charts* - show when tasks are supposed to be done

  • allow comparison with the actual progress on each task

    – serve as a control tool

  • a bar graph with time on the horizontal axis and the activities to be scheduled on the vertical axis

  • shading represents actual progress
A Gantt Chart

Activity

Edit Manuscript
Design Sample Pages
Draw Artwork
Print Galley Proofs
Print Page Proofs
Design Cover

Month

1
2
3
4

Goals
Actual Progress

Reporting Date

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Techniques For Allocating Resources (cont.)

Scheduling (cont.)

• **Load Charts** - modified Gantt Chart
• schedule capacity by work areas
• vertical axis lists either entire departments or specific resources
• allow managers to plan and **control capacity utilization**.
• Load chart schedule capacity by work areas.
A Load Chart

Editors

Anne

Antonio

Kim

Maurice

Dave

Penny

Month

1

2

3

4

5

6

Work scheduled

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Techniques For Allocating Resources (cont.)

Scheduling (cont.)

*Program Evaluation and Review Technique (PERT)* Network Analysis

- used to schedule complex projects. Such projects require coordinating hundreds of activities some of them must be done simultaneously and some cannot begin without finishing the preceding activity. E.g., building a construction project.
- Flowchart-like diagram that depicts the sequence of activities needed to complete a project
- indicates the time or costs associated with each activity
- can compare the effects alternative actions might have on scheduling and costs.
How to construct PERT network

Scheduling (cont.)

**PERT** (cont.) – nomenclature

- **events** - end points that represent the completion of major activities
- **activities** - time or resources required to progress from one event to another
- **slack time** - amount of time an activity can be delayed without delaying the entire project
- **critical path** - the most time-consuming sequence of events and activities in a PERT network
  - delays on critical path will delay completion of the entire project (zero slack time)
Steps in Developing a PERT Network

1. Identify every significant activity that must be achieved for a project to be completed. The accomplishment of each activity results in a set of events or outcomes.

2. Determine the order in which these events must be completed.

3. Diagram the flow of activities from start to finish, identifying each activity and its relationship to all other activities. Use circles to indicate events and arrows to represent activities. This results in a flowchart diagram called a PERT network.

4. Compute a time estimate for completing each activity. This is done with a weighted average that uses an optimistic time estimate \( t_o \) of how long the activity would take under ideal conditions, a most likely estimate \( t_m \) of the time the activity normally should take, and a pessimistic estimate \( t_p \) that represents the time that an activity should take under the worst possible conditions. The formula for calculating the expected time \( t_e \) is then

\[
t_e = \frac{t_o + 4t_m + t_p}{6}
\]

5. Using the network diagram that contains time estimates for each activity, determine a schedule for the start and finish dates of each activity and for the entire project. Any delays that occur along the critical path require the most attention because they can delay the whole project.
A PERT Network for Constructing an Office Building

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Expected Time (in weeks)</th>
<th>Preceding Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Approve design and get permits.</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>Dig subterranean garage.</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>C</td>
<td>Erect frame and siding.</td>
<td>14</td>
<td>B</td>
</tr>
<tr>
<td>D</td>
<td>Construct floor.</td>
<td>6</td>
<td>C</td>
</tr>
<tr>
<td>E</td>
<td>Install windows.</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>F</td>
<td>Put on roof.</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>G</td>
<td>Install internal wiring.</td>
<td>5</td>
<td>D, E, F</td>
</tr>
<tr>
<td>H</td>
<td>Install elevator.</td>
<td>5</td>
<td>G</td>
</tr>
<tr>
<td>I</td>
<td>Put in floor covering and paneling.</td>
<td>4</td>
<td>D</td>
</tr>
<tr>
<td>J</td>
<td>Put in doors and interior decorative trim.</td>
<td>3</td>
<td>I, H</td>
</tr>
<tr>
<td>K</td>
<td>Turn over to building management group.</td>
<td>1</td>
<td>J</td>
</tr>
</tbody>
</table>
A PERT Network For Constructing An Office Building
Breakeven Analysis - used to determine how many units must be sold to have neither profit nor loss

- used to make profit projections
- points out relationships between revenues, costs, and profits

- breakeven point - total revenue is just enough to equal total costs
Techniques For Allocating Resources (cont.)

Scheduling (cont.)

– *Breakeven Analysis* (cont.) - nomenclature

• $P$ - unit price of product

• $VC$ - variable cost per unit

• $TFC$ - total fixed costs

• *Fixed costs* - costs that do not change as volume increases

• *Variable costs* - costs that change in proportion to output

\[
BE = \frac{TFC}{P - VC}
\]
Contemporary Planning Techniques

Project Management

the task of getting a project’s activities done on time, within budget, and according to specifications

- **project** - a one-time-only set of activities that has a definite beginning and ending point in time

- standardized planning procedures often are not appropriate for projects. Projects are temporary in nature.

- **Project Management Process**
  - team created from appropriate work areas
  - team reports to a project manager
  - project manager coordinates activities
  - team disbands when project is completed

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Project Management Process

1. Define objectives
2. Identify activities and resources
3. Establish sequences
4. Estimate time for activities
5. Determine project completion date
6. Compare with objectives
7. Determine additional resource requirements

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Role of the Project Manager

1. role is affected by the one-shot nature of the project

2. role is difficult because team members still linked to their permanent work areas

3. members may be assigned to several projects simultaneously

4. managers must rely on their communication skills and powers of persuasion
Scenario Planning

**scenario** - a consistent view of what the future is likely to be

- contingency planning - developing scenarios
- if this is what happens, then these are the actions we need to take
- intent is to reduce uncertainty by playing out potential situations under different specified conditions
Preparing for Unexpected Events

- Identify potential unexpected events.
- Determine if any of these events would have early indicators.
- Set up an information-gathering system to identify early indicators.
- Have appropriate responses (plans) in place if these unexpected events occur.

1. *It’s a waste of time and other resources to develop a set of sophisticated scenarios for situations that may never occur. Do you agree or disagree? Support your position.*

Although the situations that scenarios depict may never occur, the process of developing the scenario can prove beneficial and worthwhile. So it’s not a total waste of time to develop these sophisticated scenarios.
2. Do intuition and creativity have any relevance in quantitative planning tools and techniques? Explain.

Yes, intuition and creativity may have relevance in determining the factors to be analyzed or the scenarios to be developed. The planning tools and techniques provide a way for the manager to quantitatively assess a situation, but the manager still needs to be creative in setting up the components to be studied.
3. *The Wall Street Journal* and other business periodicals often carry reports of companies that have not met their sales or profit forecasts. What are some reasons a company might not meet its forecasts? What suggestions could you make for improving the effectiveness of forecasting?

A company could fail to meet its forecasts for a number of reasons. For instance, the economic situation might turn negative, there might be a technological advancement that replaces the company’s product, or a new competitor might come into the marketplace. But this doesn’t mean that the company should eliminate forecasts. Instead, doing forecasts for different scenarios might increase the effectiveness of forecasting. Also, if managers use fairly simple forecasting techniques, this can improve the effectiveness of forecasting. Finally, if the length of time of the forecast is shortened, this can help improve the effectiveness.