

Planning and Forecasting

Planning

The general who wins a battle makes many calculations in his temple before the battle.

The general who loses a battle makes few calculations before hand.

It is by attention to this point that I can see who is likely to win or lose.

Planning

It is probably the most important of the identified managerial functions. It focuses you on how best to achieve the desired results. Thus, without it organizing, leading, and controlling have little purpose.

Planning

Planning: To decide in advance...

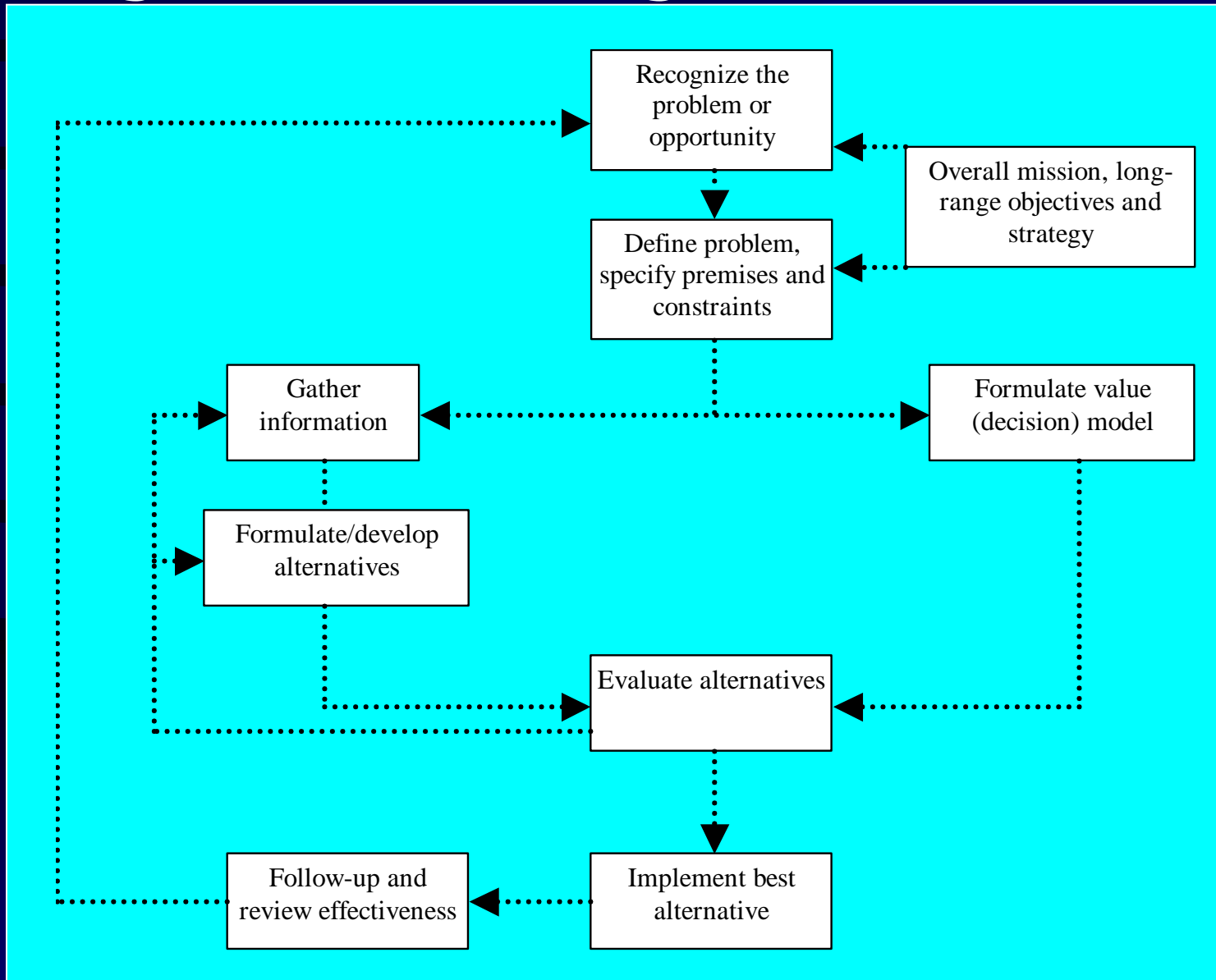
What to do

How to do it

When to do it

Who is to do it

Planning/Decision-Making Process:



The Foundation for Planning

Vision, Purpose, Mission

Clear vision of the basic purpose or mission for which an organization exists is essential for long-term success of any enterprise.

The Foundation for Planning

Vision, Purpose, Mission

Vision is the basic purpose of the organization. For example, the vision of AT&T (our business is service) or the Vietnam war.

The Foundation for Planning

Vision, Purpose, Mission

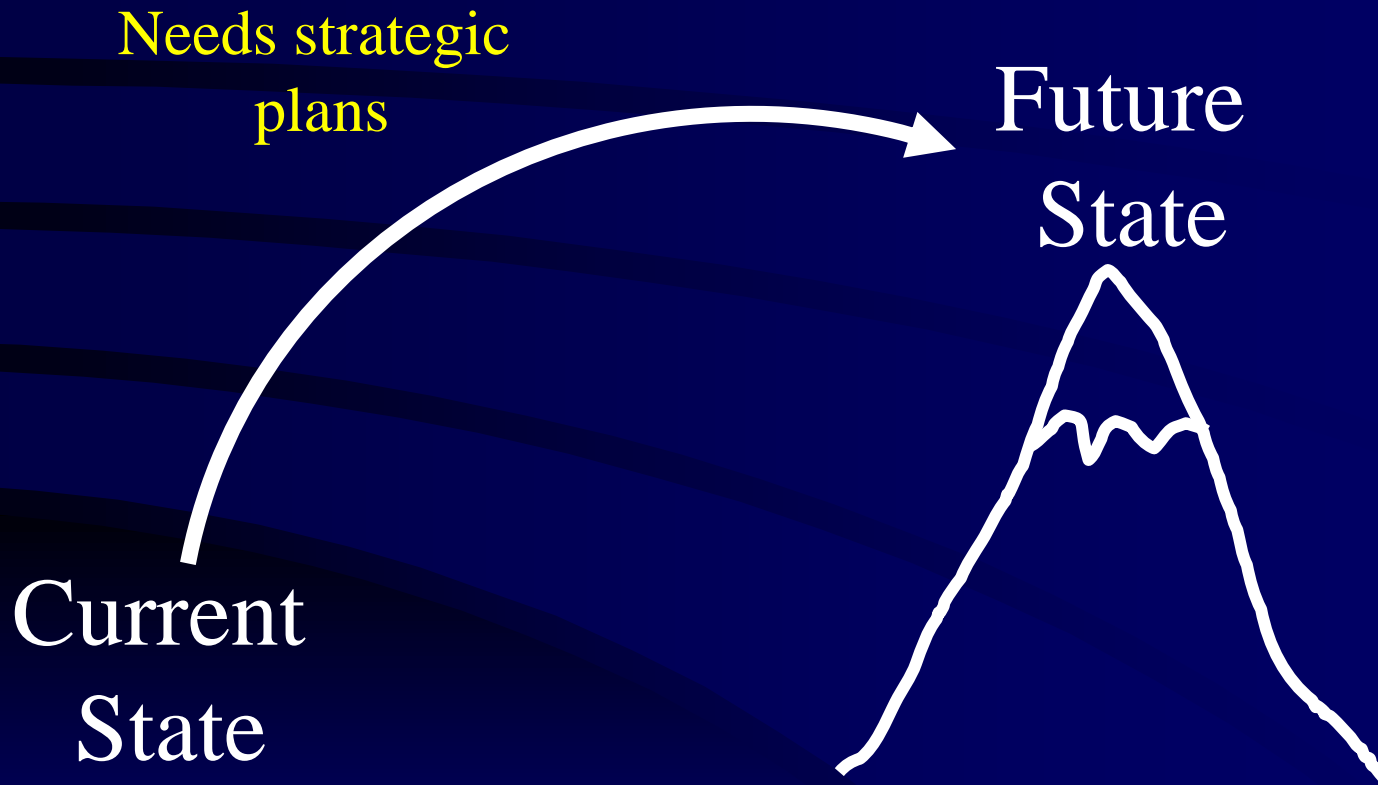
Mission **needs to be** revised **from** time to time **to** ensure the underlying assumptions are still valid.

Strategic Planning:

Once a mission is chosen, an organization needs to achieve that mission. Strategic planning is the organized process for selecting these strategies.

Strategic planning is the strategy which defines how the organization plans to move from its current state to the state envisioned in its mission and vision frameworks.

Strategic Planning:



Strategic Planning: Choose Specific Key Areas

There are essentially eight key areas for establishing objectives:

Market share

Innovation

Productivity

Physical and Financial Resources

Manager Performance and Development

Worker Performance and Attitude

Profitability

Social Responsibility

Strategic Planning:

Management by Objectives

Develop work assignments based on organizational needs and objectives.

Plans are agreed between manager and subordinate.

Objectives should be stretch objectives

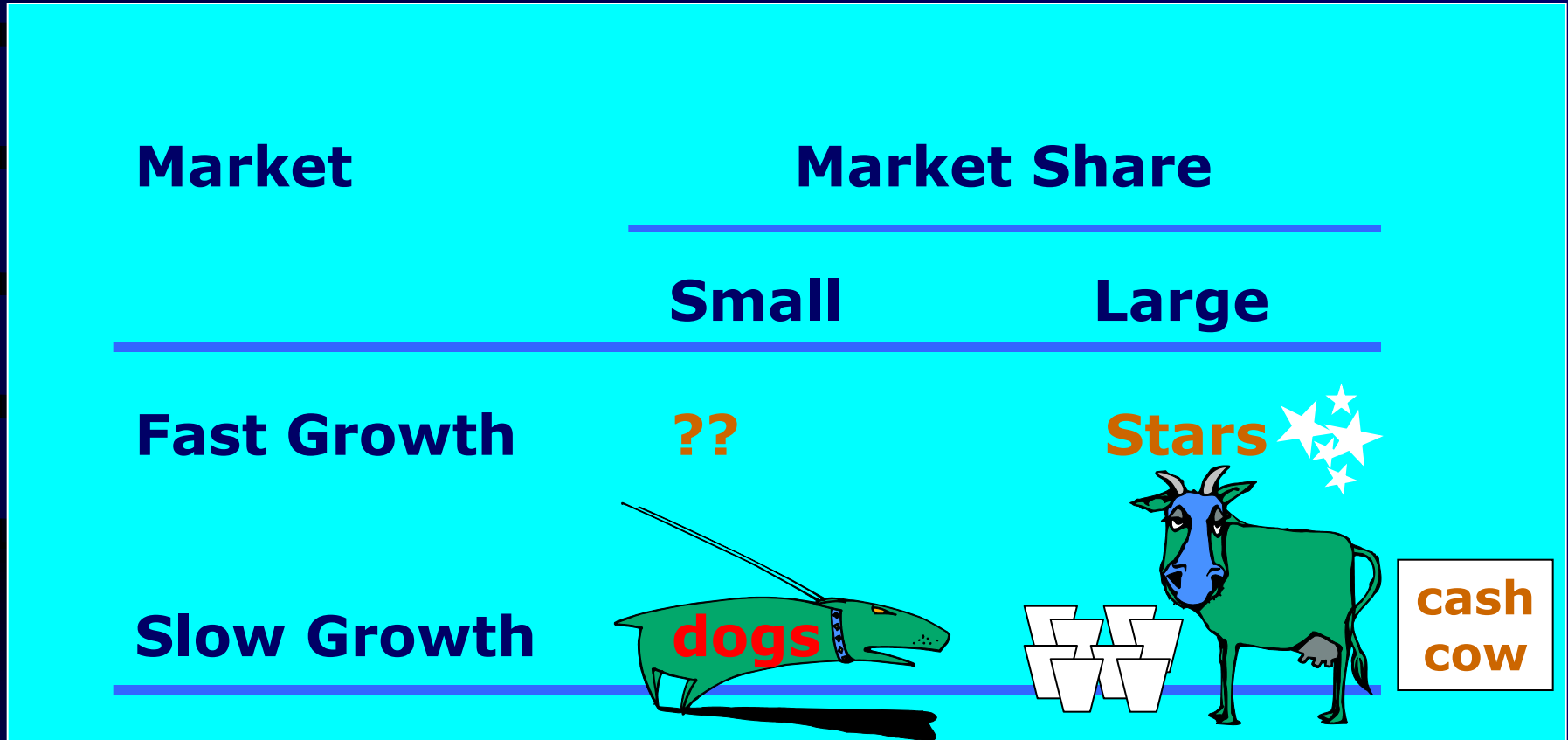
Objectives should be quantifiable (increase income by 5%) or at least tangible (written policy).

Needed resources should be determined and agreed to.

Plans should include employee development as well.

Plans are for a 6 month to 1 year time span.

Strategic Planning:



Business Portfolio Matrix

Strategic Management of Technology

Base Technologies

Key Technologies

Pacing Technologies

Some Planning Concepts

Responsibility for Planning:

It is the continuing responsibility of each manager.

The higher managers rise the more time they spend on planning.

Ultimate responsibility lies with top and middle management.

Plans must lead to action.

Some Planning Concepts

Planning Premises:

These are the assumptions under which the developed plans are expected to be executed.

Assumptions are based on forecasts and trends in market and technology.

When there is uncertainty, there is a need to develop contingency plans.

Some Planning Concepts

Planning Horizon:

Shows how far into the future do you want to plan.

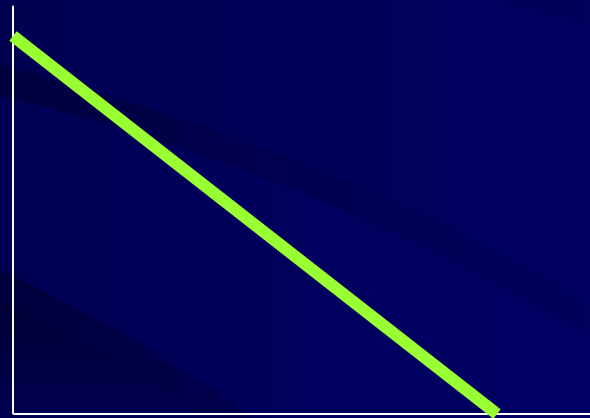
Varies depending on:

The nature of the business

The market organization is in

The required details for the plans

Details
of
Plans



Future Time

Planning Horizon

To predict/approximate what a certain future event or condition will be.

One can forecast:

Production levels

Technological developments

Needed manpower

Governmental regulations

Needed Funds

Training needs

Resource needs

Sale levels. ← The most critical information to forecast.

Two types of information to forecast:

Qualitative Information

Quantitative Information

Qualitative Forecasting

Used when:

- Past data cannot be used reliably to predict the future.
- Technological trends
- Regulations
- When no past data is available, usually because the situation is very new.
- Entry into new markets
- Development of new products

Qualitative Forecasting

Methods

- Jury of executive opinion
- Sales Force Composite
- User's Expectations
- Delphi Method

Quantitative Information

Used when data is tangible, can be used reliably to predict the future, and there is sufficient historical data upon which to base forecasts.

Sales

Profits

Production levels

Quantitative Forecasting

Methods **1. Simple Moving Average:**

Assumptions

Time series has a level and a random component only

No Trend

No seasonal or cyclical variations

$$F_{n+1} = \frac{1}{n} \sum_{t=1}^n A_t$$

n=current value n+1 = forecast value for next

A=actual value

Quantitative Forecasting

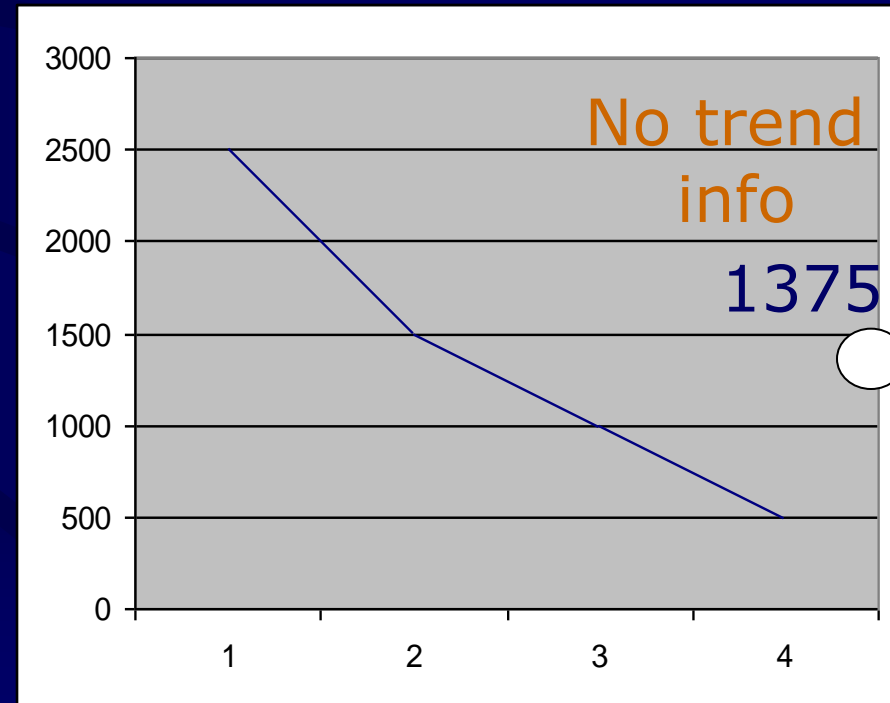
Methods 1. Simple Moving Average:

$$F_{n+1} = \frac{1}{n} \sum_{t=1}^n A_t$$

n = current value
 $n+1$ = forecast value for next
 A = actual value

Example

Period	Actual Value
1999	2500
2000	1500
2001	1000
2002	500



Quantitative Forecasting

Methods 2. Weighted Moving Average:

$$F_{n+1} = \sum_{t=1}^n w_t A_t \quad \text{where} \quad \sum_{t=1}^n w_t = 1$$

n=current value n+1 = forecast value for next
A=actual value w=weight value

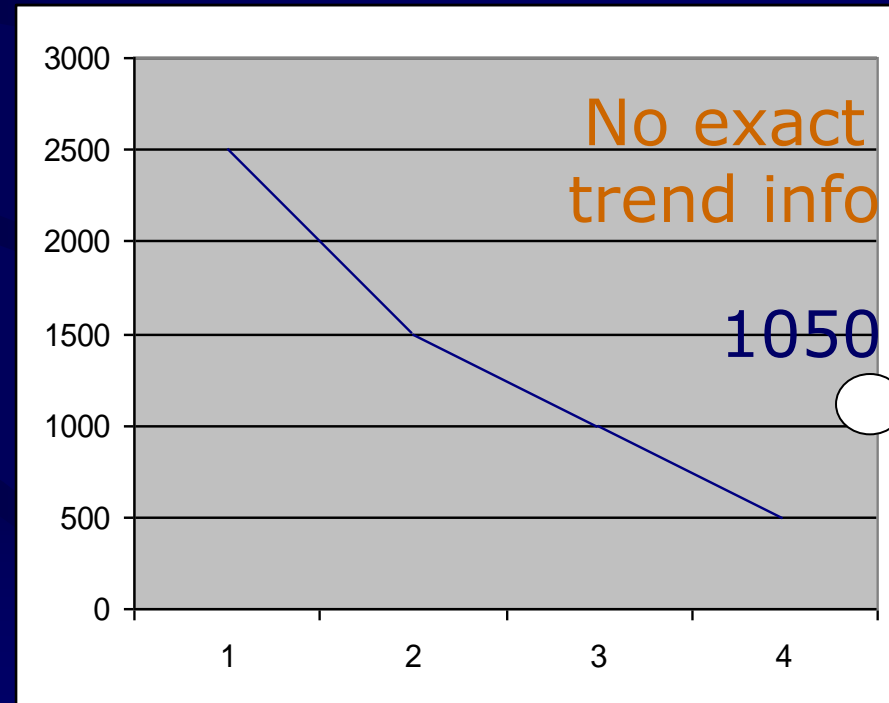
Quantitative Forecasting

Methods 2. Weighted Moving Average:

$$F_{n+1} = \sum_{t=1}^n w_t A_t \quad \text{where} \quad \sum_{t=1}^n w_t = 1$$

Example

Period	Actual Value	Weight
1999	2500	0.1
2000	1500	0.2
2001	1000	0.3
2002	500	0.4



Quantitative Forecasting

Methods **Moving Averages** Disadvantages

A trend for the period of the whole series cannot be found.

A large amount of data, equal to the period over which the average is being taken, has to be retained.

The trend is based on arithmetic averages, so it is influenced by extreme values.

All data (in the simple moving average technique) are weighted equally and data which are too old to be included are weighted by zero. Generally it is probable that recent data are more important and should have higher weights.

Quantitative Forecasting

Methods 3. Exponential Smoothing

$$F_{n+1} = F_n + \alpha(A_n - F_n)$$

$$= \alpha A_n + (1 - \alpha) F_n$$

Example (for year 2001)

$$F_{2001} = 0.4 A_{2000} + (1 - 0.4) F_{2000}$$

$$F_{2001} = 0.4 * 1500 + 0.6 * 2500$$

$$F_{2001} = 0.4 * 1500 + 0.6 * 2500$$

$$F_{2001} = 2100$$

Example

Period	Actual Value	Forecast $\alpha=0.4$
1999	2500	-
2000	1500	2500
2001	1000	2100
2002	500	1660

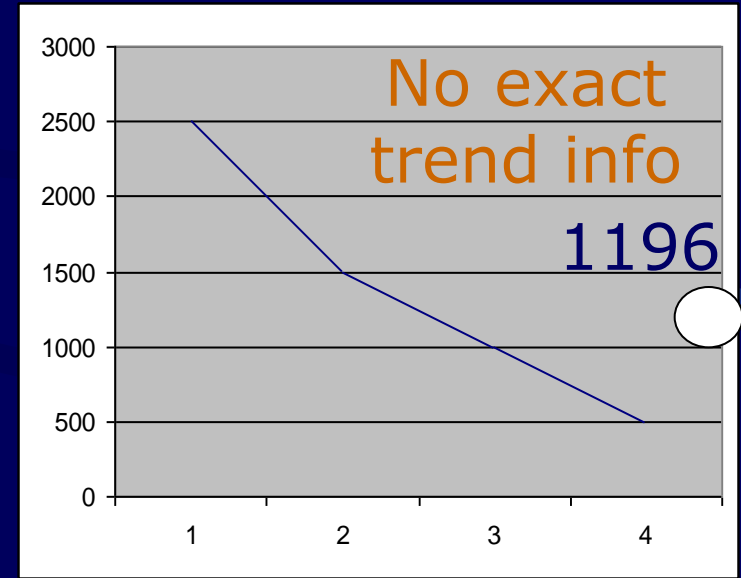
1196 for 2003

Quantitative Forecasting

Methods 3. Exponential Smoothing

$$F_{n+1} = F_n + \alpha(A_n - F_n)$$

$$= \alpha A_n + (1 - \alpha) F_n$$



Example

Period	Actual Value	Forecast $\alpha=0.4$
1999	2500	-
2000	1500	2500
2001	1000	2100
2002	500	1660

1196 for 2003

Quantitative Forecasting

Methods **3. Exponential Smoothing**

Same data assumptions as Moving Average

It overcomes disadvantages of Moving Average.

Forecast for current period is found as the forecast for the last period plus a proportion of the error made in the last forecast.

Quantitative Forecasting

Methods **3. Exponential Smoothing** Advantages:

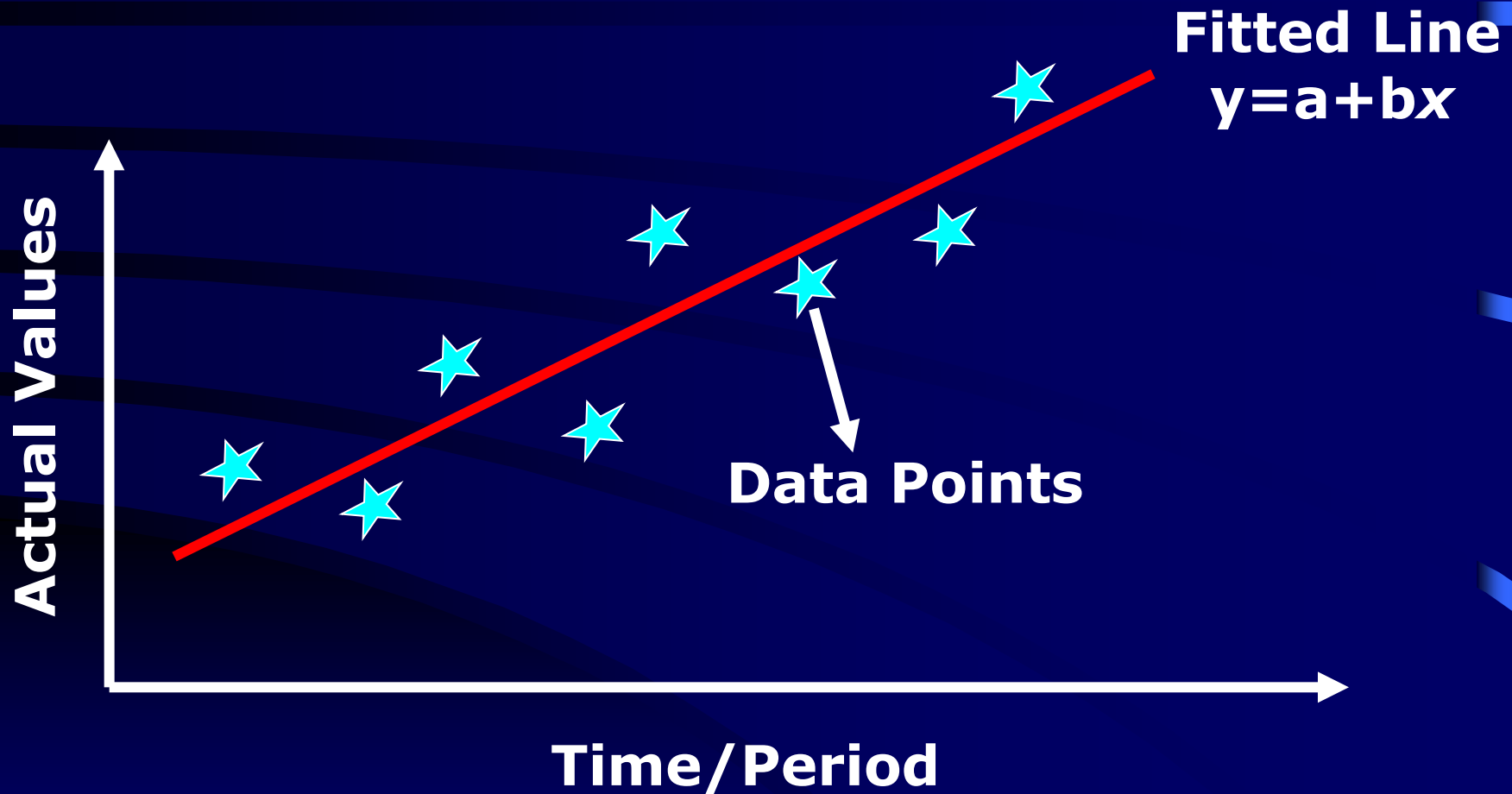
No waiting period before reliable forecasts can be calculated.

It is only required to retain three figures for any forecast: the past forecast for current period, the current actual, and the smoothing constant.

The value of α can be made to change or adapt to changed circumstances, such as for example to make the series more sensitive to rapidly changing data

Quantitative Forecasting

Methods 4. Regression Analysis



Quantitative Forecasting

Methods 4. Regression Analysis

This is an “Exploratory Forecasting Method”.

It develops “logical” relationships between variables.

Tries to minimize sum of the squares of the deviation

Gives best fit for a line passing through the data.

Quantitative Forecasting

Methods 4. Regression Analysis

$$b = \frac{n \sum (x_i y_i) - \sum x_i \sum y_i}{n \sum (x_i^2) - (\sum x_i)^2}$$

$$a = \bar{y} - b\bar{x}$$