



TOPSIM-Simulations

Learning business by doing business

TOPSIM - General Management II

Participants' Manual

Part I

Version 12.0

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1. Preface

1.1 What is TOPSIM - General Management II?

TOPSIM - General Management II is a business management game that establishes a link between business management theory and business management in practice.

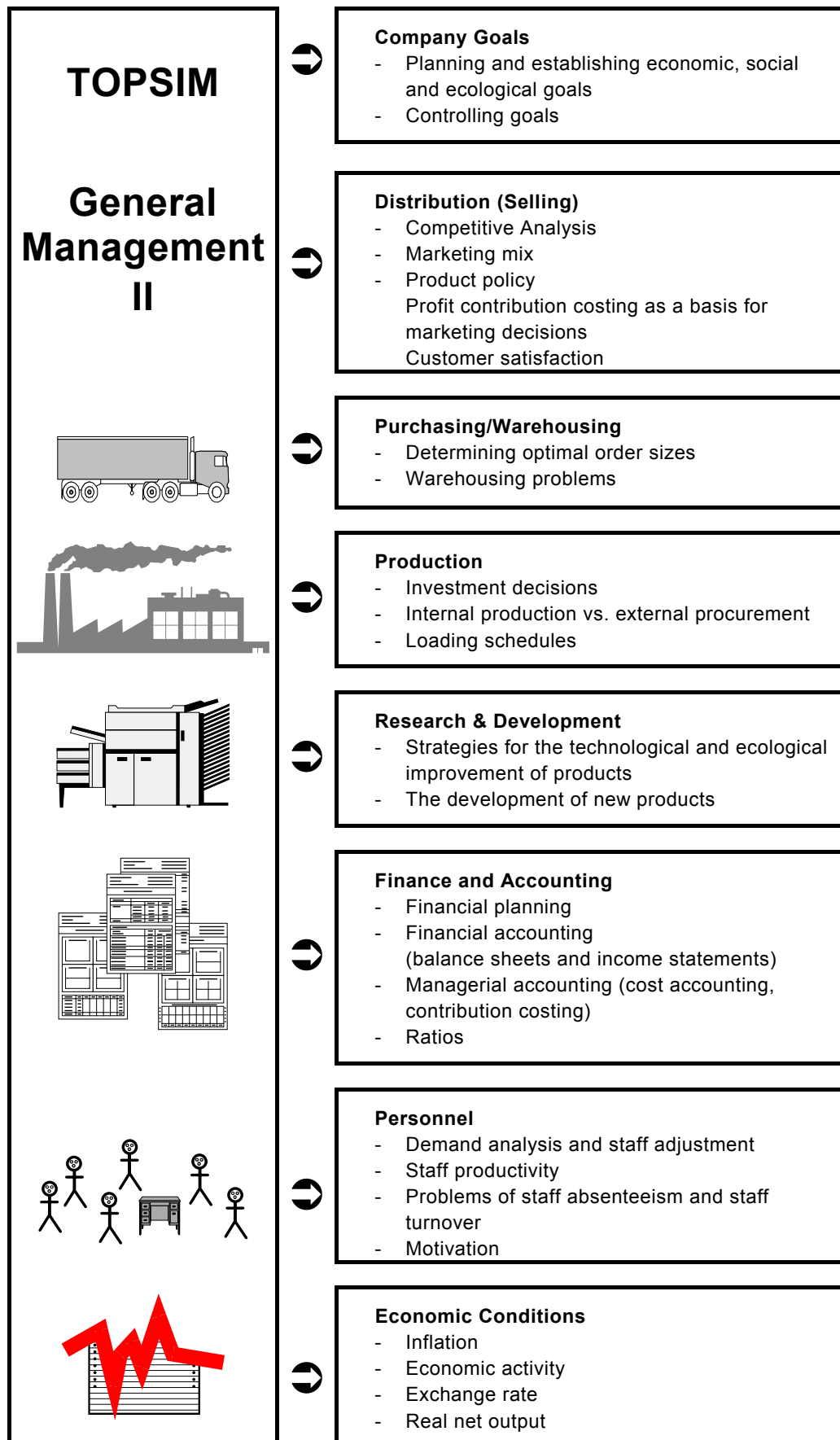
The simulation presents a realistic model of a company and thus provides participants with the opportunity to quickly gain the lasting effects of a practical experience in a risk-free environment.

TOPSIM - General Management II is an interactive teaching and learning system (which we refer to as action learning) based on the principle:

**Learning business
by doing business**

1.2 The training objectives of TOPSIM - General Management II

- ⇒ **Recognizing and formulating the general conditions for commercial success**
- ⇒ **Experiencing relationships in business management by adopting a holistic approach**
- ⇒ **Defining goals and strategies, and realizing them in an environment in which economic and ecological factors play significant roles**
- ⇒ **Deriving insights and decisions from industry figures which can be put into practice**
- ⇒ **Understanding the fundamentals of marketing**
- ⇒ **Learning to use the instruments of cost accounting, income analysis, product costing, and marginal costing**
- ⇒ **Coping with complex decision making in uncertain situations**
- ⇒ **Maintaining control of a business in difficult situations**
- ⇒ **Developing a sense for the essential and a holistic view on business**
- ⇒ **Learning to think and act in an inter-disciplinary way**
- ⇒ **Learning how to define and solve problems**
- ⇒ **Practicing effective communication through visualization**
- ⇒ **Arriving at decisions within a team by using personal computer-supported planning models**



TOPSIM General Management II

Introduction



**We welcome you
as new members of COPYFIX Inc.'s
Executive Board!**

2. Introduction

2.1 The Daily Observer - Business Section

COPYFIX INC.: Drastic changes at board level - Satisfactory results

In the past few weeks there have been rumours in the business press that COPYFIX would replace its executive board. At today's press conference satisfactory results were reported. The chairman of the Board of Directors announced the names of the new executive board members. The company hopes to provide fresh impetus through these changes in the face of growing competition, especially from abroad.

In the period under review the company achieved satisfactory results with its black and white photocopier Copy I. With sales of 129 mEuro¹⁾ and a market share of 20%, the company is faring just as well as its competitors.

This year was no exception in that no supplier was able to gain a clear advantage over competitors. Fortunately, the 1204 COPYFIX employees are working for a company with a solid background - or so it seems.

The stockholders are very optimistic about future developments since an operating income of 10.36 mEuro and a 4.6 mEuro profit were achieved this year.

The following proposal has been put forward concerning the distribution of profits: The stockholders would receive half of the profits and the other half would be invested back into the company as retained earnings.

Equity of approximately 32.6 mEuro is counterbalanced by a pension reserve of

approximately 13.9 mEuro and liabilities of 25.00 mEuro. The cash flow of approximately 13.6 mEuro will surely enable the company to make investments in the near future, but will this be sufficient in the long term? COPYFIX's antiquated production lines, which in no way meet modern environmental standards, will lead to fiscal penalties of 1.50 mEuro to be paid to the Environmental Authorities next year.

So despite the current status of the company, the future of the company is still in some doubt. Will the company be able to retain its market share if it continues to pursue the same corporate policies? Which strategies need to be devised in order to come to terms with the increasingly tight knit and complex nature of the business environment?

At the press conference there was no evidence of a clear plan for the coming years. Furthermore, at a recent employee meeting, employees accused the existing management of directing the company aimlessly, rather than effectively.

It can only be hoped that the new executive board will address the urgent issues of the coming decade with effective plans and goals.

After all, what this region needs most are new and safe jobs.

¹⁾ mEuro= million Euro

2.2 In-House Memo at COPYFIX Inc.

From: Former management

To: New management

Dear Successors,

In view of the uncongenial press reports over the last few months my colleagues and I have decided to retire since we have all reached the advanced age of 64. We will give way to younger, and perhaps more dynamic and creative colleagues.

You now face the difficult yet exciting task of familiarizing yourselves with the work involved in running COPYFIX Inc. We are leaving you with all of the reports from the last business year knowing full well, however, that figures alone cannot explain and reveal, "how our business is doing."

To start, the following diagram provides you with an outline of the various operating units, company procedures, and cost centers as well as the existing management reports at COPYFIX Inc.

Presently we are producing our black and white copier Copy I with some success. Last year we sold 43000 units at a price of 3000 Euro per machine. We supply mainly to specialized retail dealers, although sometimes also to large industrial buyers such as MEGRO. In addition, now and then we bid for procurement tenders opened by public authorities.

Until now there have been six people responsible for the following areas:

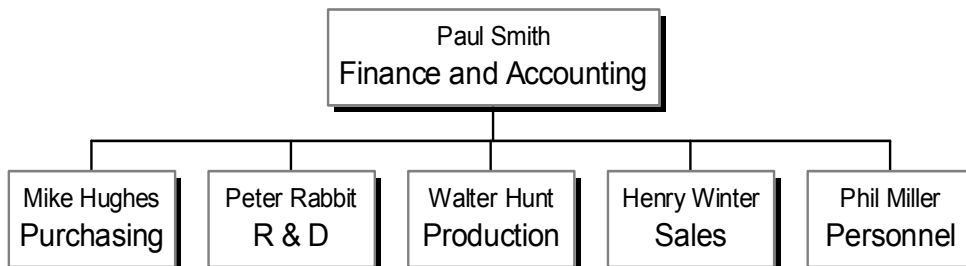


Figure: Former organizational structure at COPYFIX Inc.

The chair of the executive board changed each year on a rotating basis. In the past, cooperation within the firm has been fraught with problems caused by conflicting departmental interests. These problems, however, were often settled in a practical way and the solutions, fortunately, have benefited the company as a whole.

I feel however, that I must level one criticism at all of us, the former management team: in hindsight, sometimes our view of reality was too simplistic and optimistic. I would like to give you, as our successors, the following advice: Try to maintain a clear and unprejudiced view of reality and remember that each day begins anew. Successful strategies are becoming more and more short-lived. So it is important that the company's "files" are full of alternative strategies so that it can react swiftly to change.

In view of the fact that everybody is talking about "lean management" these days, consider whether the board really needs six members. Surely an alternative would be to combine areas of responsibility and reduce the number of members to three or four. Yet another possibility would be to plan everything together without dividing up the responsibility into functional units. Try, from the start, to find an efficient organizational system and effective way of proceeding at the board level.

From: Former management

To: New management

The diagram on the following page shows the various areas of responsibility we held, typical issues that required our constant attention, and the lines of communication we had among board members.

We have also enclosed a report written by external consultants concerning the individual members' areas of work on the executive board and their views about the activities of their colleagues. As a matter of fact, everyone seems to view their own and other people's tasks from their own personal perspective.

Following this in-house memorandum you will find detailed information on the various areas of our company. As the new chairman of the Board of Directors I look forward to future board meetings with you. Finally, my colleagues and I would like to take this opportunity to wish you a most successful future!

Yours sincerely

Paul Smith

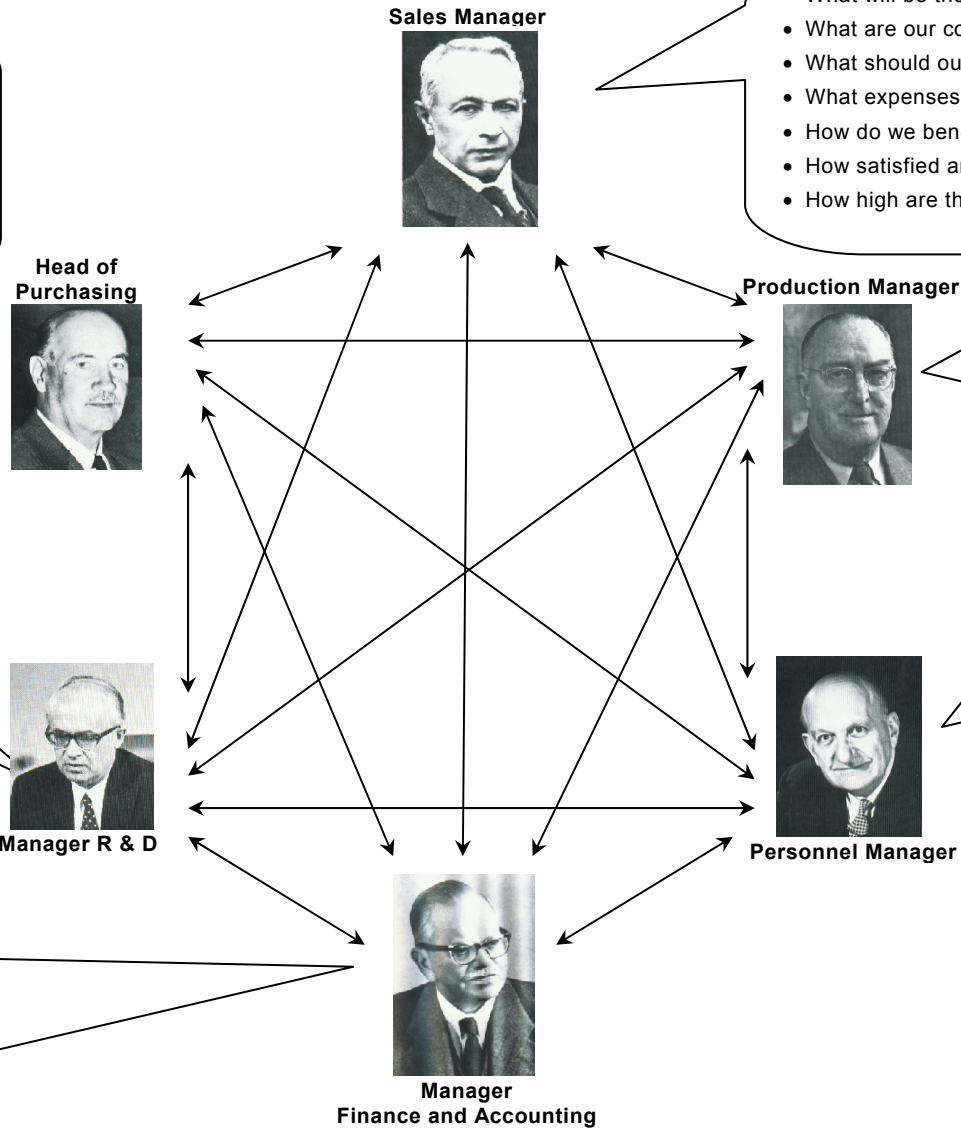
(Chairman of the Board of Directors, COPYFIX Inc.)

Functional Areas, Typical Concerns, and Lines of Communication of the Previous Executive Board of COPYFIX Inc.

- How can we take advantage of economies of scale?
- How high are the storage costs?
- How much more must be purchased to receive quantity-based discounts?
- What are the raw material requirements for the coming period?

- What product attributes do customers desire?
- Which product attributes do we wish to provide?
- What are the costs involved in achieving this?
- How should we react to the developments of our competitors?

- How is income generated and where are costs incurred?
- How much profit must be made in order to survive?
- Are we working efficiently?
- Where is there potential for cost reductions?
- What is necessary in order to optimize the value of the company?
- What is our rating? What can we do to improve it?



- What will be the size of the entire market in the next period?
- What are our competitors going to do?
- What should our market share be?
- What expenses are associated with our marketing-mix?
- How do we benefit from bulk buyers and requests for bids?
- How satisfied are our customers?
- How high are the costs of goods manufactured?

- How much can the plants produce?
- How much must/should they produce?
- What have we accomplished through "lean management"?
- How productive should we be?
- What influences the costs of goods manufactured?

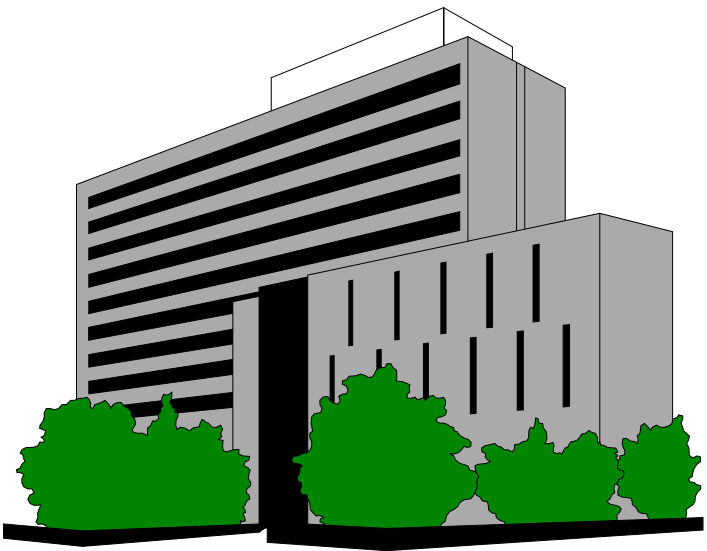
- What are the overall effects of expenditures on incidental personnel costs, training, and lean production?
- What are the staff requirements in production for the coming periods?
- How can we reduce absenteeism?
- What can we do to increase staff motivation?

TOPSIM

General Management II

The Functional Areas of COPYFIX Inc.

COPYFIX Inc.



Functional Areas

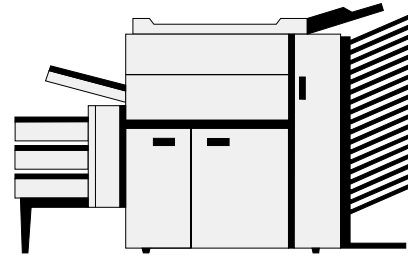
<input type="checkbox"/> Sales	<input type="checkbox"/> Production
<input type="checkbox"/> Research & Development	<input type="checkbox"/> Personnel
<input type="checkbox"/> Purchasing	<input type="checkbox"/> Finance and Accounting

3. The Functional Areas of COPYFIX Inc.

3.1 Sales

3.1.1 Product Description and Product Policy

COPYFIX Inc. sells a high-quality black and white copier Copy I (referred to as "product 1-old" in the reports shown in section 4.2). It possesses the following technical characteristics:



Product Details of Copy I			
Type	Desk model		
Copying speed	36 A4 copies per minute. 18 A3 copies per minute.		
Copy pre-setting	1 - 99		
Dimensions	W	L	H
	804	664	415 mm
Weight	80 kg		
First page out	In approximately 7 Sec.		
Paper supply	2 cassettes of 500 sheets (A3, A4)		
Copy formats	Cassette A5 - A3 Sheet feeding A5 - A3		
Copying material	Paper cassette, sheet feeding Transparency Self-adhesive labels		
Accessories	"Job interrupt" key Auto 2-side copying Auto reset		

The technology and the degree of environmental-friendliness of copiers available on the market are examined regularly by *TechTest*, a consumer magazine. In comparison with other copiers COPY I is in the middle of the range as far as these characteristics are concerned.

Figures published by *TechTest* following quality control tests for Copy I (for Period 0):

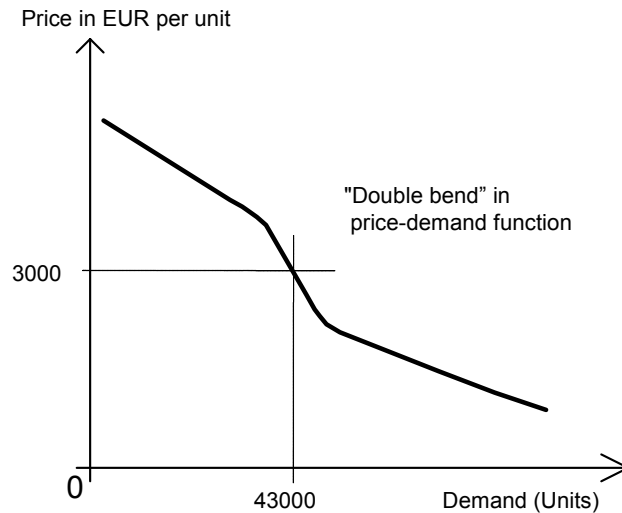
Technology index: 100.0 Ecology index: 100.0

Such publications are considered as guidelines for consumers. Consequently, index values are viewed as important product attributes: As the indices for technology and ecology improve, market acceptance for Copy I increases. Heightened awareness among consumers of environmental issues is reflected in the ecology index. A high ecology index means for example, that the product consumes less energy and is more conducive to recycling, and that the company produces less emissions.

3.1.2 Pricing Policy

When competing with other suppliers, the price is an important marketing instrument that has immediate effects. At the start of the game the price on the domestic market (referred to as "market 1" in the reports shown in section 4.2) is **3000 Euro**.

The following relationship exists between price and sales volume:



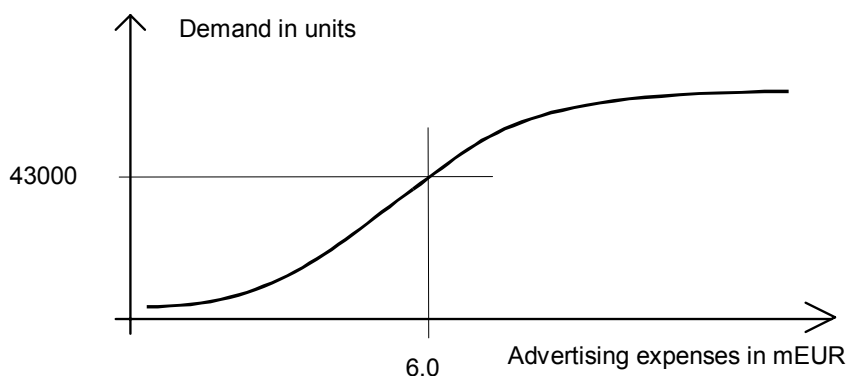
Market researchers believe (provided that all other variables remain constant) that demand can be expected to react to price as follows.

Price (EUR/Unit)	Demand (Units)
3150 (+ 5%)	Approx. 36000
3000 (Period 0)	43000 (Period 0)
2850 (- 5%)	> 55000

3.1.3 Promotion Policy

3.1.3.1 Advertising

Normally, advertising expenditures increase demand. They have an effect over several periods yet the most pronounced effect occurs in the period during which they are incurred. The effect of advertising on demand is represented on the following graph:



In the period at the start of the game the advertising budget for market 1 is **6.00 mEuro**. Experts are of the opinion that sales of approximately 45000 can be achieved with advertising expenditures of 7.00 mEuro. Once advertising expenditures double, the effect on sales tapers off.

3.1.3.2 Corporate Identity and Corporate Image

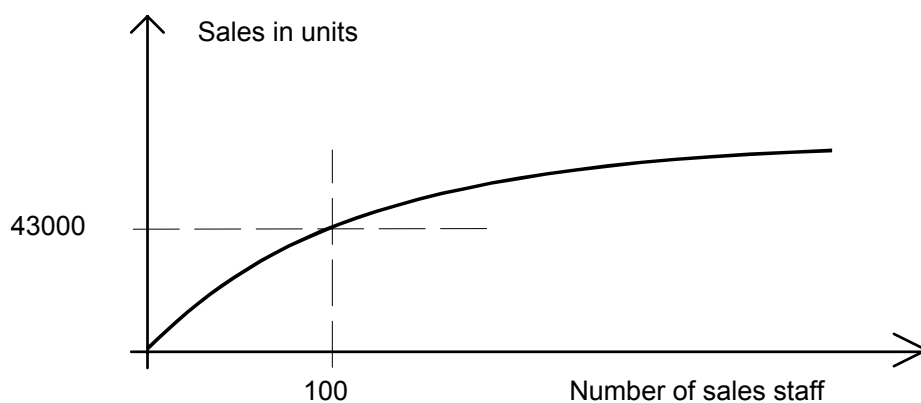
Another measure that can be taken by the company is to consistently develop its company image (corporate identity) in order to positively influence sales. In Period 0, spending amounted to **2.00 mEuro**.

A favourable corporate identity may not be directly related to sales volume. Therefore, experts disagree as to whether it has any concrete effects. It is clear, however, that the company's image is an important factor for the success of the whole company and has a relatively long-lasting effect.

The corporate image has an effect on the stock exchange price of the company. Every period, the image of the company as seen by the public is ascertained and recorded as an index. CI expenditures influence this index considerably. However, additional factors such as environmental damage caused by the company, and the degree of environmental-friendliness of the product also play important roles.

3.1.4 Distribution Policy

In Period 1, Copy I is sold to specialized retail traders **on the domestic market (= market I)** by a **sales staff of 100**. An increase in the utilization of personnel improves sales opportunities and has an effect over several periods. Experts are of the opinion that a sales force of 110 persons could increase sales up to approximately 45000 units. Generally the following relationship exists between the utilization of sales personnel and sales:



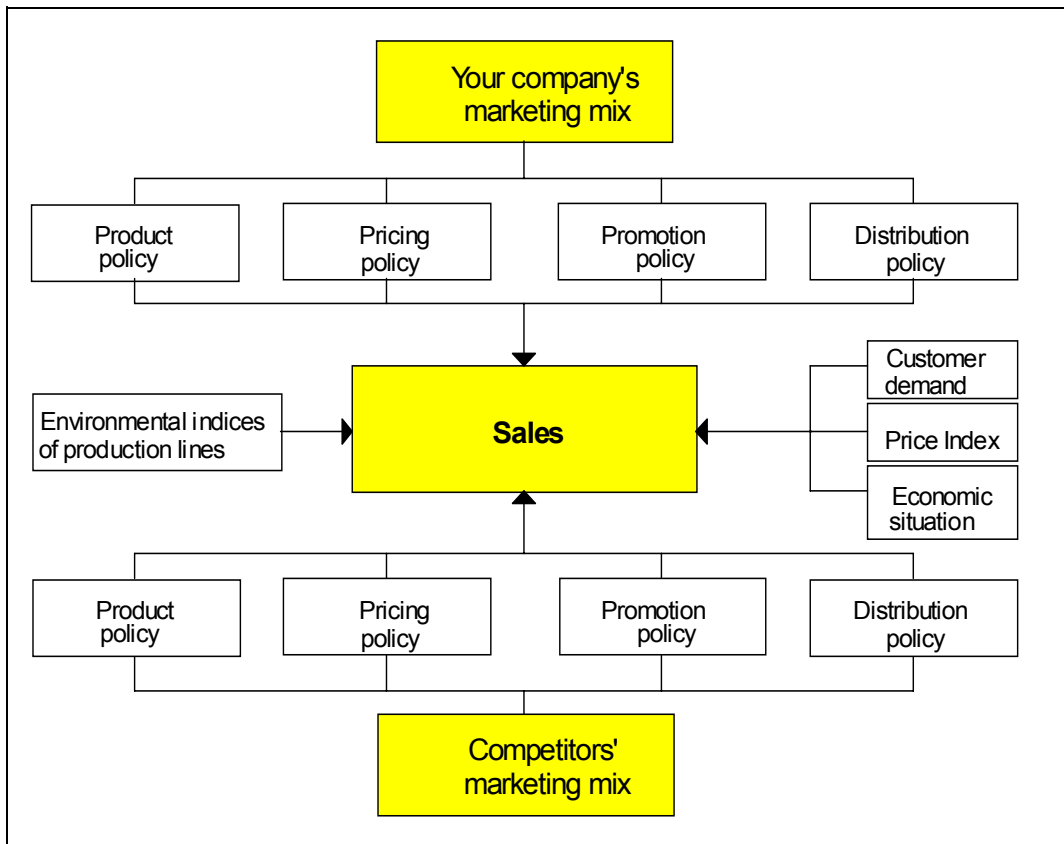
Supplying copiers to specialized retail traders involves packaging and transport costs of **25.00 Euro per machine**.

3.1.5 Marketing Mix

Sales of Copy I depend on the selection and implementation of all marketing instruments. They are to complement one another in such a way that they together achieve the desired effect on the market as a combination of marketing tactics (the marketing mix). The components of the marketing mix are as follows:

- ⇒ **Product attributes (Product policy)**
- ⇒ **Price (Pricing policy)**
- ⇒ **Promotion expenditures (Promotion policy)**
 - Advertising expenses
 - Expenses for corporate identity
 - Corporate image
- ⇒ **Utilization of sales staff (Distribution policy)**

When planning your marketing mix you should remember that its impact is also **directly influenced by the marketing efforts of your competitors in the market** and the overall economic conditions.



3.1.6 Bulk Buyers / Requests for Bids

In addition to sales to the specialized retail trade, two other opportunities can be explored on the domestic market. The company can respond to **requests for bids** such as those opened by public authorities, or supply **private bulk buyers**.

3.1.6.1 Sales to Bulk Buyers

All companies can sell to bulk buyers. **The bulk buyer fixes the price and the maximum supply quantity per company.** A smaller quantity can be supplied, if necessary. **The quantity required by the bulk buyer is supplied in the current period and takes precedence over sales to retailers.** No distribution costs are incurred when selling to bulk buyers.

This distribution channel may be used to reduce inventory. Contribution margins however, are usually lower in comparison to sales to retail stores. The cost of goods manufactured (COGM) will serve as the basis for decisions pertaining to bulk buyers. This figure can be found in the "Unit-of-output costing" report from the cost accounting department.

3.1.6.2 Sales Through Requests for Bids (Tenders)

When public authorities have a specific need for copiers in large quantities they request bids by stating the quantity that they **require**. Companies can respond to such a tender by **bidding**. The bid may not exceed the quoted price on the domestic market. The company offering the lowest price is awarded the contract. **Income from new sales and revenue from a successful bid in one period are received in the following period. Furthermore, delivering tender quantities also takes priority over supplying retailers.** In the event that companies quote the same price, the company whose product possesses the better product attributes receives the contract. There are no distribution costs associated with winning a bid either.

The cost of goods manufactured (CGM) will also serve as the basis for calculating the bid price. This figure can be found in the "Unit-of-output costing" report from the cost accounting department.

3.1.7 Insufficient Capacity to Supply

Copy I is supplied in the following order:

- ⇒ **Contracts resulting from requests for bids**
- ⇒ **Commitments to bulk buyers**
- ⇒ **Specialized retail trade (Market 1)**

If, as a consequence of your marketing mix, you create higher demand than your company is able to satisfy, you will lose these sales due to your insufficient capacity. Approximately **80%** of the demand that you were unable to meet in market 1 is distributed amongst the other companies in proportion to their existing market shares.

3.1.8 Customer Satisfaction

Customer satisfaction also has an important (but difficult to measure) influence on demand. Experts state the following as factors of customer satisfaction:

Factor	Effect on customer satisfaction
Ability to supply in previous period	Inability to supply annoys consumers
Price changes	Customers prefer constant or decreasing prices
Price performance ratio	If the company's product is better than the product of its competitors, higher prices can be commanded without the risk of having dissatisfied customers.
Stock of old equipment	Customers always want the most recent and best-designed products. A large stock of old equipment may lead to dissatisfaction among customers.
Corporate image	A positive corporate image encourages customer satisfaction.

Customer satisfaction is calculated per product for every market and is measured with an index displayed in Report 2. In Period 0, the index is at 100. High customer satisfaction leads to a high index value while a low index value means that customers are experiencing a lower level of satisfaction.

3.1.9 Market Research Report for the Industry

In order to obtain information on the marketing efforts of competitors, you may in any period purchase a market research report for **0.10 mEuro**. The market research report contains the following information:

No. 12 MARKET RESEARCH REPORT I

MARKET RESEARCH REPORT I	COM-PANY	PRICE EUR	ADVERTISING		SALES		REVENUE		PRODUCT INDICES	
			mEUR	%	Units	%	mEUR	%	Technol.	Ecology
PRODUCT 1 MARKET 1	1	3000	6,00	20,0	43000	20,0	129,0	20,0	100,0	100,0
	2	3000	6,00	20,0	43000	20,0	129,0	20,0	100,0	100,0
	3	3000	6,00	20,0	43000	20,0	129,0	20,0	100,0	100,0
	4	3000	6,00	20,0	43000	20,0	129,0	20,0	100,0	100,0
	5	3000	6,00	20,0	43000	20,0	129,0	20,0	100,0	100,0
	Avg/Tot	3000	30,00	100,0	215000	100,0	645,0	100,0	100,0	100,0

OTHER DATA	COM-PANY	PROD. STAFF	PROD.1 O/R/N	PRODUCTION LINES			R & D Expenses (mEUR)	SALES/DIST. (No. of ppl.)
				Type A	Type B	Type C		
	1	850	0	4	0	0	5,0	100
	2	850	0	4	0	0	5,0	100
	3	850	0	4	0	0	5,0	100
	4	850	0	4	0	0	5,0	100
	5	850	0	4	0	0	5,0	100

3.1.10 Inventory for Copy I

The storage costs for the finished goods are:

0.10 mEURO	per 1000 units (closing inventory)
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Here is an excerpt from the inventory report:

INVENTORY			
INVENTORY OF FINISHED PRODUCTS	Quantity (Units)	CGM (EUR/Unit)	Value of Inventory (mEUR)
Initial inventory	8000	2020	16.16
+ Qty. produced	40000	2052	82.07
- Qty. distributed	43000	2046	88.00
= Final inventory	5000	2046	10.23

The closing inventory in Period 0 is 5000 units valued at a cost of production of 2046 Euro per unit. This value is simply a weighted average.

$\frac{16.16 \text{ mEUR} + 82.07 \text{ mEUR}}{8000 \text{ Units} + 40000 \text{ Units}} = 2046 \text{ EUR/Unit}$
--

3.2 Research & Development

Companies must continue to further develop their products due to technological progress, increasing environmental awareness on the part of consumers, and growing pressure from competitors. To further develop Copy I (referred to as "Product 1-old" under section 4.2 in the reports) COPYFIX Inc. can take the following measures:

Measures in the area of	Result	Effects
1. Technology Staff recruitment in area of R & D.	Advance in technology Technology index rises	<ul style="list-style-type: none"> - Market share increases. - Rework costs rise due to higher technical standards (e.g. demand for precision, increased complexity)
2. Ecology Expenses for external consultancy services in the area of ecology.	Increase in environmental sustainability Ecology index rises	<ul style="list-style-type: none"> - Market share rises.
3. Value analysis Expenses for external consultancy services in the area of value analysis.	Increase in efficiency Value analysis index rises	<ul style="list-style-type: none"> - Consumption of materials decreases - Increased costs through rework. - No influence on market share

Decisions for Period 0:

Decision area	Decision	Index value
Technology	34 employees	100.0 (<i>TechTest</i>)
Ecology	2.5 mEURO	100.0 (<i>TechTest</i>)
Value analysis	1.0 mEURO	100.0

Excerpt from the "Product Development" report in Period 0:

Product Development									
	Technology			Ecology			Value analysis		
	(mEUR)		Index	(mEUR)		Index	(mEUR)		Index
Products	Period	Cumul.		Period	Cumul.		Period	Cumul.	
Prod. 1-old	1.50	8.20	100.0	2.50	5.00	100.0	1.00	1.00	100.0

Note: Expenditure on technology during the period = No. of staff * Labor costs
 = 34 * 44 000 Euro

3.3 Purchasing

3.3.1 Demand and Price Conditions

With a value analysis index of 100.0, **one unit of "input materials/parts"** must be employed per copier. Value analysis reduces the required input material, i.e. with a value analysis index of more than 100.00, less than one unit of input materials is needed per copier. The demand for input materials/parts is calculated as follows:

Demand in units	=	Units of Copy I to be produced	*	100
		Value analysis index		

Prices for input materials vary with the quantity purchased. The prices per unit drop as larger quantities are ordered as shown below:

Volume (Units)			EUR per unit
0	to	< 30000	650
30000	to	< 50000	550
50000	to	< 70000	450
70000	upwards		400

The input materials/parts ordered in a period are already available for production at the start of the period in question.

If in one period there are insufficient input materials available, then the deficiency is automatically resolved by employing special measures such as express shipments, air freight etc. A premium of 20% must be paid when express shipments of input materials are required.

3.3.2 Inventory for Input Materials/Parts

The storage costs for input materials/parts are:

0.05 mEURO	per 1000 units of closing inventory
-------------------	--

The closing inventory in Period 0 amounts to 15000 units valued at 527 Euro * per unit.

INVENTORY			
INVENTORY OF INPUT MATERIALS/PARTS	Quantity (Units)	Inventory	
		(EUR/Unit)	(mEUR)
Initial inventory	25000	500	12.50
+ Qty received from supplier	30000	550	16.50
- Qty used in Production	40000	527	21.09
= Final inventory	15000	527	7.91

* This value is calculated as a weighted average between the value of the opening inventory and the value of the inventory added in the period.

3.4 Production

3.4.1 Production Lines at the Start of the Game

At present COPYFIX Inc. possesses four type A production lines. The production lines are numbered 1 to 4. The following data applies to plants presently in use:

Production lines Type Nr.	Pot. Cap. (Units)	Procurement period	Acquisit.- value (mEUR)	Remaining life (Periods)	Depreciat. (mEUR/ Period)	Net book value (mEUR)	Other FC (mEUR/ Period)	Enviro. index
A 1	8.000	- 8	12,50	1	1,25	1,25	1,50	83,0
A 2	9.000	- 7	15,00	2	1,50	3,00	1,00	90,0
A 3	11.500	- 6	20,00	3	2,00	6,00	0,50	95,0
A 4	13.500	- 5	20,00	4	2,00	8,00	0,25	98,0
∑	42.000		67,50		6,75	18,25	3,25	Ø 91,5

Even though the production lines are of the same type, their capacities and the extent of damage they cause the environment vary. The performance data remains the same throughout the entire lives of the machines.

Miscellaneous fixed costs from the production lines are, for example, inspection and insurance costs resulting from contracts.

Once production lines are depreciated, they may still be utilized for production purposes.

3.4.2 Production Capacity Required

One available unit of capacity is required to produce one Copy I. Capacity demand may be different for new products.

3.4.3 Means of Influencing Production Capacity

The **available production capacity** in a period can be influenced by the following means:

- ⇒ Investments in new plants
- ⇒ Disinvestments of lines
- ⇒ Maintenance
- ⇒ Rationalization
- ⇒ Overtime allotted to production lines

3.4.3.1 Investments

For the production of Copy I, new production lines of Type A, B, and/or C can be purchased. The differences between the types of production lines are illustrated in the following table:

Type of line	Purchase price (mEUR)	Term (Periods)	Normal capacity (Units/Period)	Misc. fixed costs (mEUR/Period)	Environm. index	Remaining revenue (% of the net book value)	Rationalization factor
A	20.00	10	14,000	0.30	100.0	20	1.00
B	25.00	10	18,000	2.00	105.0	25	1.00
C	30.00	15	22,000	2.50	110.0	30	1.00

A maximum of nine production lines may be purchased per type. Newly acquired production lines are immediately available for production in the period in which the order is made.

3.4.3.2 Disinvestments

Production lines can be disinvested (scrapped). A production line that has been scrapped is no longer available at the start of the period in question.

A production line that has been scrapped is immediately depreciated at the value of the net book value (stated as "Other Expenditure" in Report 4). Proceeds are made by scrapping the machine. These proceeds are a percentage of the net book value. The percentage varies according to the different types of lines.

Production Line	Type A	Type B	Type C
Proceeds from scrap (Residual revenue) as % of net book value	20	25	30

In one period a maximum of three production lines of the same type may be disinvested. In order to disinvest a certain production line, you are required to enter the **number** of the line in the decision form.

The effects of disinvestments in the

⇒ **Profit and Loss Account:**

Depreciation (Net book value) = Other expenditure
 Residual revenue = Other income
 (Proceeds from scrap)

⇒ **Financial Report:**

Residual revenue = Deposit from disinvestments
 (Proceeds from scrap)

3.4.3.3 Maintenance

The production lines are subject to constant wear and tear. Reductions in capacity that can result from wear and tear can be avoided or held in check by ensuring that the parts of the plant in need of repair are regularly maintained. This also applies to newly acquired production lines.

The following figures demonstrate the relationship between maintenance costs and the degree to which capacity is available. One can also interpolate functional values that lie between the figures stated here. This relationship applies to all production lines.

Maintenance costs per period and production line in mEUR			Degree of capacity availability as % of normal capacity
Type A	Type B	Type C	
0.10	0.10	0.10	50
0.50	0.40	0.40	70
0.70	0.60	0.60	80
1.00	0.90	0.80	95
2.50	2.20	2.00	97
3.00	2.70	2.40	99
4.00	3.60	3.20	100

Normal capacity	*	Maintenance factor	=	Available capacity I
------------------------	----------	---------------------------	----------	-----------------------------

The minimum level of maintenance expenses per production line is **0.10 mEuro**. (You may enter values that lie between those given in the table.)

3.4.3.4 Rationalization

The available capacity of the production lines can be further increased by rationalization measures. Rationalization can only be carried out uniformly for **all the production lines of one type**. The degree of rationalization achieved is expressed in terms of a rationalization factor and depends on the cumulative rationalization expenses incurred in mEuro since Period 0 for the respective production lines. Newly acquired production lines have an initial rationalization factor of 1.00.

The entire rationalization expenditure from a period is claimed in the same period as **costs**.

Available capacity I	*	Rationalization factor	=	Available capacity II
-----------------------------	----------	-------------------------------	----------	------------------------------

3.4.3.5 Overtime Allotted to Production Lines

Overtime can further increase Available Capacity II, but only up to a **maximum of 10%**. The program automatically schedules overtime when the planned production volume is higher than the available capacity. If overtime is necessary then **extra supervisory and operating costs** (step-fixed costs) of **2.50 mEuro** are incurred in the period.

Available capacity II	*	Overtime factor	=	Available capacity III
------------------------------	----------	------------------------	----------	-------------------------------

3.4.4 Investments in Environmental Technology

By investing in environmental technology, through additional purification plants or filters (end-of-pipe investments) you can reduce the overall amount of environmental damage caused by your company. (You can only improve the ecology index of the production lines themselves by replacing certain lines.) **If the environmental damage indicator drops below the legally required level of 100.0 (Index)**, then in the following period a penalty charge per missing index point must be paid to the Environmental Authorities. Based on the values from Period 0, **1.50 mEuro** must be paid in Period 1.

Environmental index of production lines (end of Period 0)	Index	91.50
Cumulative investment in environmental plants (end of Period 0)	mEUR	1.50
Improvement in environmental indices (end of Period 0)	Points	1.00
Environmental damage indicator of production lines (end of Period 0)	Index	92.50
Penalty charge payable to authorities next period	mEUR	1.50

Investments in environmental technology are depreciated over 10 years using the straight-line method.

Your company's environmental damage indicator has a direct influence on the following factors:

- ⇒ Sales
- ⇒ Absenteeism of production employees
- ⇒ Corporate image
- ⇒ Share price
- ⇒ Motivation of staff in production

3.4.5 Rework

Rework (reject) expenditures incurred are included in production costs. These depend on the following factors:

- Technology index** ⇒ Higher technology leads to more rework as a result of the product's increased complexity
- Value analysis index** ⇒ Intensified value analysis increases expenditures on rework.
- Level of non-salary staff costs** ⇒ Higher non-salary staff costs lead to reduced rework (rejects) as a result of increased staff motivation.
Highly motivated staff leads to reduced rework.
- Motivation of staff** ⇒ Low motivation leads to high amounts of rework.

3.4.6 Factory Materials

In Period 0, factory materials cost **50 Euro** per Copy I manufactured. The factory materials are purchased automatically and are always readily available in the required amounts.

3.5 Personnel

3.5.1 Labor Force at the Start of the Game

In Period 0, staff and salary costs at COPYFIX Inc. are allocated as follows:

Cost center	Final workforce	Salaries in Period 0 in EUR without non-salary staff costs
Purchasing	18	30000
Administration	202	28000
Production	850	30000
Research & Development	34	44000
Marketing/Sales	100	40000
Total	1204	

The “Administration” cost center encompasses the following areas:

- ⇒ Human Resources Management
- ⇒ Finance and Accounting
- ⇒ General Administration

3.5.2 Potential Changes to the Workforce

3.5.2.1 Recruitment and Dismissals

You may recruit and dismiss **Production** staff. In the case of **R & D** as well as in **Sales** you simply determine the final workforce level. The software will automatically “recruit” and “dismiss” employees as it makes the necessary change to the workforce.

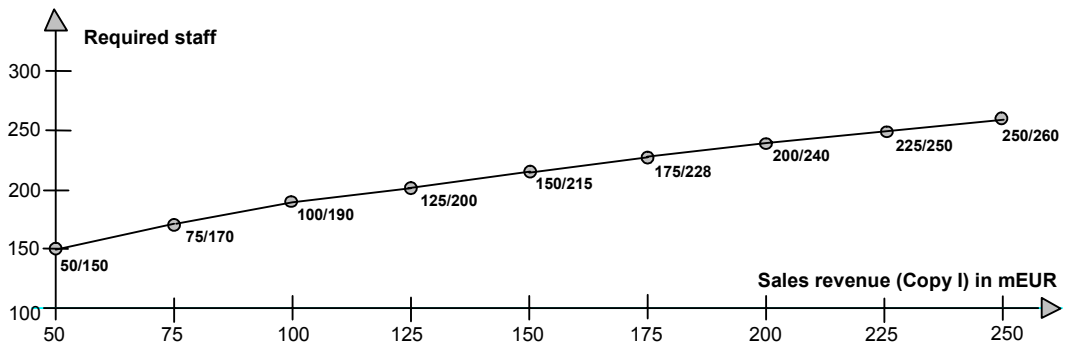
Each new hire in a cost center causes the company to incur non-recurring costs of **12500 Euro**. Non-recurring dismissal costs amount to **10000 Euro**. If more than 5% of the staff from the areas of production, R&D and Sales are dismissed, then the company’s union (game facilitator) can demand that severance packages be discussed. Redeployment in the areas of R&D (from product 1 to product 2 or vice versa) and Sales (e.g. from market 1 to market 2) does not constitute recruitment or dismissal. The maximum number of new hires recruited for production may be restricted by possible bottlenecks of the labor market.

In the various functional areas of the company, the workforce is also influenced by employees’ who quit (**attrition**). The rate of attrition depends to a large extent on the level of the **non-salary staff costs**.

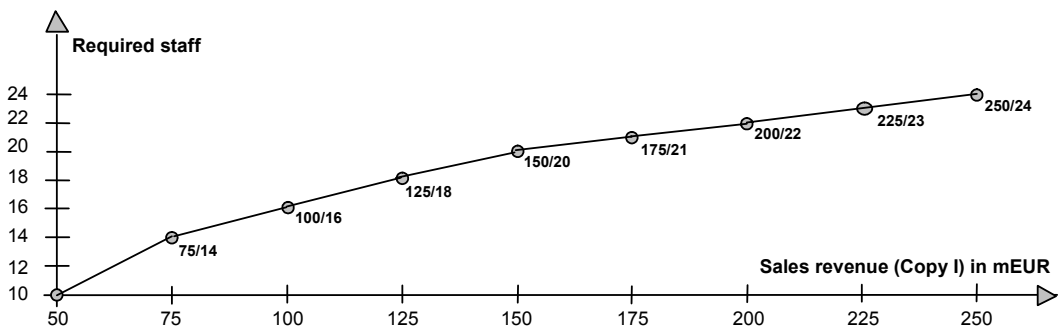
3.5.2.2 Human Resources Planning (Purchasing and Administration)

The number of employees in the areas of **Purchasing and Administration** depends on the company’s sales revenue. If the sales revenue fluctuates the number of necessary employees is adjusted automatically by hiring and dismissing employees. In Administration, however, **2.50 mEuro** in fixed personnel costs apply in the initial situation regardless of sales revenue.

Cost Center: Administration: Required Staff Based on Sales Revenue (Copy I):



Cost Center: Purchasing: Required Staff Based on Sales Revenue (Copy I):



3.5.3 Non-Salary Staff Costs

Most recently, non-salary staff costs are 40 % of the respective wage and salary totals. A minimum rate of 37 % is legally required and comprises of the employer's contribution to social benefits, paid holidays, etc.

Non-salary staff costs can be increased at will, but may only be reduced, at most by 3 %, in comparison to the previous period.

Non-salary staff costs have a direct influence on the **rate of attrition** as well as on employee **absenteeism**.

3.5.4 Employee Pension Plan

COPYFIX Inc. has agreed to provide all employees with a pension plan. Therefore, in each period, the **pension reserve** accrues by 5 % of the total value of wages and salaries.

3.5.5 Production Staff Motivation

The production staff's level of motivation influences productivity. Increased motivation reduces rework. As a psychological factor, the level of staff motivation can be hard to control and sometimes changes very quickly. At present the following are plausible as factors that influence the level of motivation among production staff:

Influencing factor	Change in the Influencing factor	Effect on motivation

Employee benefit costs	↗	↗
Pension reserve	↗	↗
Training	↗	↗
Process optimization	↗	↘
Staff utilization	↗	?
Corporate image	↗	↗
Product quality	↗	↗
Change in number of employees	↗	?

Staff utilization of about 98 % is usually beneficial for the company in terms of maintaining or increasing the motivation of the staff. A manageable growth rate has positively affects the rate of attrition.

Motivation is measured with an index. You can find the motivation index in the report on human resources (Report 3). In period 0, the motivation index is 80. A higher/ lower index value means a higher/ lower level of motivation.

3.5.6 Personnel Report of Cost Centers

In each period you will receive the following table describing the workforce, staff changes, and personnel costs for the cost centers.

Excerpt from the report for Period 0:

STAFF BREAKDOWN BY DEPARTMENT (COST CENTER)						
Number of persons	Purchasing	Admin.	Production	R & D	Sales/Dist.	Total
Initial workforce	18	201	851	34	100	1204
+ Hired	1	9	50	1	9	70
- Dismissed	0	0	0	0	0	0
- Staff turnover	1	8	51	1	9	70
= Final workforce	18	202	850	34	100	1204
Wages & Salaries (1) mEUR	0.54	5.66	25.50	1.50	4.00	37.19
Turnover/Training mEUR	0.01	0.11	1.13	0.01	0.11	1.37
Non sal. staff costs mEUR	0.22	2.26	10.20	0.60	1.60	14.88
Pension reserves mEUR	0.03	0.28	1.27	0.07	0.20	1.86
Total staffing costs mEUR	0.80	8.31	38.10	2.18	5.91	55.30
Non-salary staff costs as % of wages and salaries: 40.0						
Training (Production) mEUR: 0.5						
Motivation of staff (Index) 80						

(1) without overtime costs

3.5.7 Overtime Production Staff

The **normal level of productivity** for an employee in production is **50 "Copy I" copiers** per period. Overtime is automatically scheduled when the planned production volume cannot be produced with the available number of staff (or with the available production capacity.) The percentage of possible overtime is limited. Presently the limit is **10%**. (see also section 3.4.3.5)

If overtime is scheduled, whether caused by insufficient production staff or production lines, extra costs of **2.50 mEuro** per period are incurred for supervision and operation. (see section 3.4.3.5) Additionally, **25% of wages and salaries** is paid to production staff as a result of overtime. (These additional premiums are not recorded in the personnel report.)

3.5.8 Productivity

3.5.8.1 Process Optimization Projects

With the help of process optimization projects the production processes can be rationalized, which leads in turn to increases in staff productivity. However, such projects can also lead to increases in absenteeism.

In Period 0, the **process optimization index** is **1.00**. Consultants believe that an index of approximately 1.04 can be attained with an investment of 2.5 mEuro. Once an index value has been reached, 0.01 points is lost per period due to knowledge loss (as employees "forget how to do things"). The minimum value remains 1.00.

3.5.8.2 In-Service Training

Expenditures on in-service production staff training improves the skills of the employees and leads to increased productivity. Expenditures on training increase the **staff competence index (Period 0 = 1.00)**. This value is also reduced by 0.01 points per period due to knowledge loss (employees "forgetting how to do things"). Contrary to the process optimization index, however, this value **can drop below 1.00**. In-Service Training reduces absenteeism.

3.5.8.3 Productivity Index I

Productivity Index I is derived from the indices for process optimization and staff competence. The productivity of the staff can be influenced directly by training and process optimization. Staff motivation also influences productivity. Recruitment of under-qualified personnel, however, reduces the average level of productivity. Overall, the productivity index is a reflection of the process optimization index, the staff competence index, and the factors of staff motivation.

PRODUCTION STAFF : PRODUCTIVITY	
Process optimisation index	1.00
* Adaptation	1.00
* Staff competence index	1.00
* Motivation index	1.00
= Productivity index I	1.00

3.5.8.4 Experience and Productivity

As more units are produced, production workers gain more experience. This results in an increase in productivity. In other words, production workers are experiencing a **learning curve**. It is measured by **Productivity Index II**. This index is at **1.00** in the starting situation. The gain in productivity resulting from a learning curve does not deteriorate over time.

3.5.8.5 Actual Productivity

Therefore, the actual productivity of an employee in production is:

<p>Normal productivity (e.g. 50 Copy I / period) * Productivity index I * Productivity index II</p>
--

3.5.9 Absenteeism

Absenteeism reduces the number of staff that can be utilized in production. The following factors influence the rate of absenteeism:

Influencing factor	Measure for influencing factor	Effect on absenteeism
Non-salary staff costs	↗	↓
Process optimisation projects	↗	↗
Environmental index of production lines	↗	↓
In-service training measures	↗	↓
Staff increase (Recruitment)	↗	↗
Staff cuts (Dismissals)	↗	↓
Staff motivation	↗	↓

3.5.10 Production Staff Table

Excerpt from report (values for Period 0):

PRODUCTION STAFF : AVAILABILITY AND PRODUCTIVITY				
Workforce	(No. of ppl)	850	Process optimisation index	1.00
Newly hired	6.3 %		* Adaptation	1.00
- Loss from absent.	(No. of ppl)	50	* Staff competence index	1.00
			* Motivation index	1.00
= Available staff	(No. of ppl)	800	= Productivity index I	1.00

3.6 Finance and Accounting

3.6.1 Customer Payment Patterns

- 80% of the current period's sales revenue is paid in the current period.
- 20% of the current period's sales revenue is paid in the following period.

This also pertains to bulk buyers and requests for tenders. Payment amounts to be received in the following period are shown in the current period's balance sheet under "Accounts receivable".

3.6.2 Financial Investments

In any period the company's executives can purchase **securities** - provided that they have surplus liquid funds at their disposal. In the first period of the game the interest rate is **3.0%**. The yield on interest is credited in the current period. The securities themselves are automatically sold and paid for in the following period.

3.6.3 Rating

COPYFIX Inc. is subject to a rating from its bank. A good rating improves borrowing conditions, a poor rating leads to an increase in the interest rate on borrowed capital in the following period. The most important factors on the rating are listed as follows:

Influencing factor	Change in the influencing factor	Effect on rating
Equity ratio	↗	↗
Equity capital, absolute value	↗	↗
Profit for a year	↗	↗
Operating cash flow / debt	↗	↗
Free cash flow / debt	↗	↗
Planning quality	↗	↗
Overdraft loans	↗	↘
Staff productivity	↗	↗
Staff motivation	↗	↗
Technology of products	↗	↗
Customer satisfaction	↗	↗

The actual rating of COPYFIX Inc. is average. It is displayed as a score measured by the number of points, and in Period 0 the company has a rating of 100 points. Each period you can find the company's actual rating in the reports. If the rating changes, the borrowing conditions for the following period will also change.

3.6.4 Loans

3.6.4.1 Medium-Term Loans

Depending on the company's needs a medium-term loan may be taken out in any period. The term of the loan is one period, and the interest on this loan is paid in the current period. The loan is automatically repaid in the following period. The interest rate is calculated according to the amount of equity capital from the previous period. The following interest rates applied in Period 0.

• Up to the amount of equity capital	8.0 %
• Up to twice the amount of equity capital	10.0 %
• Above twice the amount of equity capital	12.0 %

At the beginning of Period 0 the equity capital was equal to 28.00 mEuro, and the medium-term loans taken out in Period 0 were 25.00 mEuro. Consequently, the interest for Period 0 was calculated as follows:

25.00 mEuro loan at 8.0% ⇒ 2.00 mEuro interest

3.6.4.2 Long-Term Loans

You always have the option to replace medium-term loans with long-term loans. Long-term loans have a ten-year term. **The advantage gained in terms of the lower interest rate is offset by the fact that a long-term loan cannot be repaid prematurely.** The interest rate is 7.0 % in the initial period, but is subject to change.

3.6.4.3 Overdraft Loans

If in one period the company cannot cover all of its financial obligations, it is automatically granted an overdraft loan so that it can avoid insolvency. The company's **cash balance** must amount to at least **0.10 mEuro**. An interim loan will tie you over until a cash balance of 0.10 mEuro is achieved.

The interest rate for the overdraft loan was **13.0 %** in Period 0, and the interest is due in the current period. The overdraft loan itself is repaid automatically in the following period.

3.6.5 Taxation and Dividend Payments

The company's tax burden is equivalent to **45%** of the

<p>Profit or loss on ordinary activities ± Extraordinary profit or loss.</p>

Losses are carried forward and offset annual pre-tax profits until a positive balance (for which taxes must be paid) is attained. Tax payments occur in the current period.

Each year COPYFIX Inc. must pay out at least 30% of the annual after-tax profits as dividends in accordance with its charter. A high payout, however, has a positive influence on the company's **share price**.

3.6.6 Share Price and the Value of the Company

In each period the share price is determined. It reflects the value of the company. The following factors have an influence on the share price:

Influencing factor	When the value of the influencing factor increases ...	The influence on the share price is
Equity capital for period	↗	↗
After-tax profit for period	↗	↗
Declared dividends for period	↗	↗
Cumulatively declared dividends	↗	↗
Return on sales	↗	↗
Cumulative expenses for marketing mix	↗	↗
Corporate image	↗	↗
Environmental index of production lines	↗	↗
Sales compared with competitors	↗	↗
Planning quality	↗	↗
Debt-equity ratio	↗	↘

3.6.7 Shareholder Earnings

The shareholders of COPYFIX Inc. evaluate the value of their shares in terms of how much their shares have contributed towards increasing their personal assets (for example, through dividends paid out or increases in share price). Gains from dividends paid and share price increases are recorded as shareholder earnings in the ratios of the company. (In the initial situation no such figures are available.)

3.6.8 Industry Business Reports

Every period you receive a statement with the most important figures from your profit and loss accounts, as well as the balance sheets of competing companies free of charge from a business reporting service.

3.6.9 Accounting

COPYFIX Inc. has a modern accounting department, which was set up to ensure that comparisons within your industry would be possible. The company's managerial accounting department performs the important functions of planning and controlling costs through cost type accounting, cost center accounting (departmental costing), and unit-of-output costing. The financial accounting department ensures that the company complies with legal requirements and produces statements that report on the financial situation of the company. The accounting department is performing a profit-contribution-margin analysis and the findings will be available in some of the later periods.

For analyzing cost center reports the following information is of interest:

Depreciation for land and buildings:

The depreciation amount per period for land and buildings is **0.25 mEuro**. This depreciation amount is allocated to the cost centers as follows:

Purchasing	Production	R & D	Sales	Administration
5%	70%	5%	5%	15%

Maintenance in administration:

The machinery in the administration department (copiers, computers etc.) must also be maintained so that they continue to function properly. Fixed maintenance contracts cost **1.00 mEuro per period**.

Administration costs:

In Period 0, the **2.50 mEuro** fixed cost for wages and salaries is debited from the "Administration" cost center (as **overhead**). Also see section 3.5.2.2. The remaining wages and salaries from administration are allocated to the product as **direct costs**.

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TOPSIM - General Management II

Checklist for the First Period of the Seminar

1. What type of company are we working for?

Internal structures (operating units, cost centers)
Market (customers and competition)
Production costs, Production output



2. What do we want to have achieved by the end of the game? What are our goals:

Market share, Sales, Turnover,
Product attributes,
Profit for the year, Return on equity ...

3. How do we wish to achieve our goals? What will be our strategies:

Conservative? Expansive? High risk?
What marketing mix do we wish to use over the various periods?
Can we achieve our goals with the strategies we have selected?

4. How will we organize ourselves within our team?

Who will take responsibility for what?
Will we divide functional roles among team members or work altogether?
Will we rotate jobs?

5. How will we organize the work within our team (methods and procedures)?

Time management for analysis and decision making

6. How can we identify and be informed of significant events (early warning signals)?

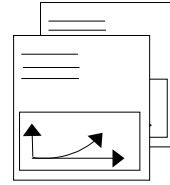
Development of a system to stay well-informed
Development of a decision-oriented planning system

TOPSIM - General Management II

Stockholders' Meeting

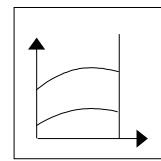
1. What was planned?

- What were our goals and strategies?



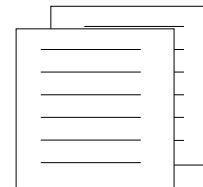
2. How did things arise? (Decisions and Changes)

- Sales
- Marketing mix
- Net income
- Share price
- ...



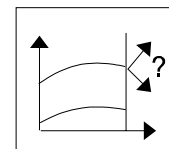
3. Where do we stand?

- What was our total inventory in the final period?



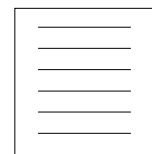
4. How would we have continued?

- What are our prospects for the next 5 periods



5. What have we learned?

- What would we have done differently?



6. What was our group work like?

- How did we work together? How were our group dynamics?



Time for the group presentation: Maximum 25 minutes

Management Consultants' Findings

How COPYFIX Inc.'s Executive Board Members View Their Own Personal Strategies and Activities and Those of Their Colleagues

Who ↓ Managers	How they view them →	Manufacturing	Sales	Human Resources	Purchasing	R & D	Finance and Accounting
Manufacturing		<ul style="list-style-type: none"> • Play big!!! • Make money! 	<ul style="list-style-type: none"> • Production is too expensive • Chooses the wrong planning capacity • Always causes the inventory to fill up 	<ul style="list-style-type: none"> • Ensures that there are sufficient resources for salaries for marketing personnel • Minimizes attrition 	<ul style="list-style-type: none"> • What does he want from me? 	<ul style="list-style-type: none"> • Produce developments too late • Brings in own ideas, instead of what the customers require • Too reluctant 	<ul style="list-style-type: none"> • Reduces marketing personnel and therefore marketing effectiveness • Have no sense of the markets
Sales		<ul style="list-style-type: none"> • Can never settle on definite production figures • I am the one suffering from inaccurate sales forecasts 	<ul style="list-style-type: none"> • Nothing runs without me • Favorable costs are only possible with the most modern systems and increasing utilization 	<ul style="list-style-type: none"> • Has to be more flexible in adjusting personnel capacity • Allocates surplus personnel everywhere and fails to transfer them 	<ul style="list-style-type: none"> • Just-in-time inventory produces a reduction in costs 	<ul style="list-style-type: none"> • Because of unnecessary product improvements rework and retooling arise 	<ul style="list-style-type: none"> • Bean counters! • Prevents opening new manufacturing plants, and forecasts the wrong sales amounts
Human Resources		<ul style="list-style-type: none"> • Demands low level of attrition on the one hand yet is asking for rapid adjustments in the level of sales personnel on the other hand 	<ul style="list-style-type: none"> • Because of their irregular work schedules I am constantly bothered by the labor unions. 	<ul style="list-style-type: none"> • Long-term personnel planning lowers the personnel expenditures • High social security benefits (supplementary personal expenses) increase motivation 	<ul style="list-style-type: none"> • Personally, I have no problems with purchasing. 	<ul style="list-style-type: none"> • Wants too much and wants everything immediately • Produces too much too fast without consideration for what we can use later 	<ul style="list-style-type: none"> • Saves in the wrong places with stagnating levels of personnel expenditures • Bonuses would increase motivation
Purchasing		<ul style="list-style-type: none"> • We only meet each other in the boardroom, otherwise we have no contact with each other. 	<ul style="list-style-type: none"> • Rarely thinks of how much material he will need in the future 	<ul style="list-style-type: none"> • He is a nice guy, who surely does his best 	<ul style="list-style-type: none"> • High purchase quantities produce high discounts • Gain from economies of scale through purchasing 	<ul style="list-style-type: none"> • With more value analysis I could save on material 	<ul style="list-style-type: none"> • Does not understand purchasing problems • Crunches numbers until they are inefficient or uneconomical
R & D		<ul style="list-style-type: none"> • Gives me impossible improvement requests • Modifies specifications too often and is too easily influenced by the competition 	<ul style="list-style-type: none"> • Says developments are unnecessary, too complex, and thereby lead to higher retooling and rework costs • Always thinks his ideas are better 	<ul style="list-style-type: none"> • Reacting quickly to market conditions requires fast changes to personnel 	<ul style="list-style-type: none"> • I have no problems with purchasing 	<ul style="list-style-type: none"> • Only the highest quality products produce gains • Must constantly improve our products. 	<ul style="list-style-type: none"> • Know only one expression "this costs too much" • Think simpler products would do the same job
Finance and Accounting		<ul style="list-style-type: none"> • Orients himself too strongly towards the competition and thinks only of price reductions • Believes in marketing too much 	<ul style="list-style-type: none"> • Very cost-conscience • Does not understand cost accounting 	<ul style="list-style-type: none"> • Gives too much money away for supplementary expenses • Should be more assertive with wage negotiations 	<ul style="list-style-type: none"> • Relies too much on setting up comprehensive cost calculations for purchasing strategies 	<ul style="list-style-type: none"> • Rarely thinks of the cost of the product • Always wants to be better than the competition 	<ul style="list-style-type: none"> • Must drastically reduce all costs • All products and markets must bring in a profit