

Optimal decision-making in the Global Management Challenge

Application of Operations Research in Value-Based Management

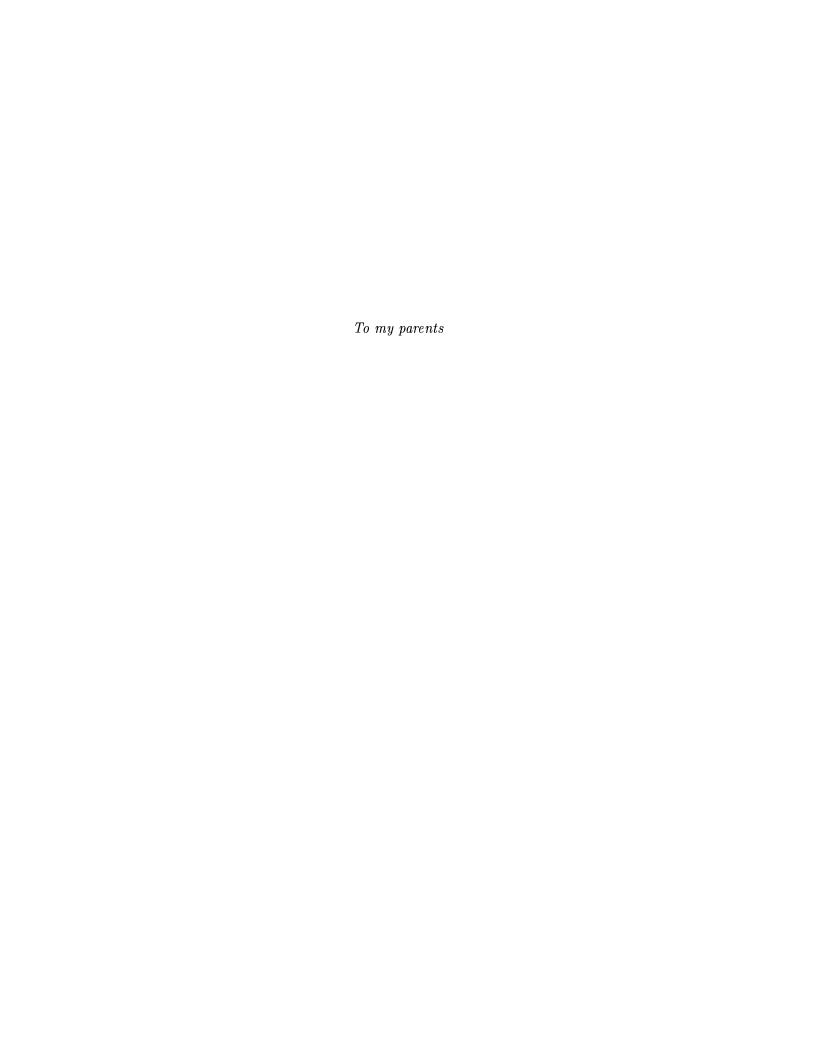
Master Thesis

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Abstract

Value-Based Management is a management approach that aligns overall business' activity toward its fundamental goal, which is building wealth of its owners. The concept has gained Worldwide recognition and has been acknowledged as a successful driver of firm's stock performance. High demand for Value-Based Management services has driven the development of different VBM frameworks, to mention Economic Value Added developed by Stern Steward & Co., McKinsey's Economic Profit and PricewaterhouseCoopers' Shareholder's Value Added. Although they differ in technicalities, they all suggest that the ultimate measure of firm's success is the excess of firm's profit over the cost of capital committed.

The thesis shows how optimization can be used to build shareholders' wealth. Within the Global Management Challenge tournament as a stock-market environment, the author builds optimization models aiming at maximization of Economic Value Added - World's most renowned VBM metric.

Acknowledgements

Writing the thesis has been a true journey into the unknown. I therefore would like to express my sincere gratitude to Professor Jens Clausen for giving me freedom in my research under his inspiring supervision and insightful advice that gave it the final shape.

The thesis would not be the same without love and support of my fiance Amelia Górniak, who has patiently been there for me throughout the entire journey. Thank you.

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Chapter 1

Introduction

1.1 Introduction

Global Management Challenge is the largest strategic management tournament, in which more than 400 000 individuals have participated in 23 countries Worldwide.

The competition is based on complex management of a joint-stock company in simulated conditions of European Union and NAFTA. The business is of international character and is exposed to global trends and macroeconomic conditions. The teams compete at a virtual stock-exchange, on which their firms are quoted. Their performance is evaluated based on the share price quoted at the last quarter of the simulation.

Although both in Global Management Challenge and in real life, the stock price is characterized by stochastivity, certain managerial activities have proven to have positive impact on stock performance. We have experienced rapid development of Value-Based Management approaches, which combining multidisciplinary knowledge provide management with proper tools and methodologies to build firm's value. One of such frameworks is Economic Value Added, developed by Stern Stewart & Co.

The goal of the thesis is utilizing optimization to maximize Value-Based Management metrics, aiming at achieving a victory in Global Management Challenge.

1.2 Main Concepts

1.2.1 Value-Based Management

Value-Based Management is a management concept that enables companies to gain better performance by systematically managing value creation. It is a framework and a mindset that help companies develop strategies, allocate resources and accomplish performance targets that lead to maximization of shareholder wealth.

Timothy Koller in McKinsey Quarterly writes: "Value-Based Management is a management approach that aligns firm's overall aspirations, analytical techniques and management processes to focus management decision making on the key drivers of value."[1]

Value-Based Management promotes new measurement system. The ultimate measure of success is the economic profit, being the return on capital in excess of the cost of that capital. Moreover, VBM introduces a series of adjustments to accounting profit in order to reach firm's true profit, which is then diminished by the cost of capital engaged in generating the profit.

Secondly, VBM promotes comprehensive management system that consists of policies, methodologies and tools that support decision making at all levels of organization. The system should cover all operational areas of the firm, streamlining day-to-day scheduling, resource allocation etc. It should also enhance strategic management with value creation as firm's paramount goal.

Thirdly, VBM postulates binding firm's compensation system with performance of an individual. The performance ought to be measured by clear metrics that are aligned with firm's ultimate goal. Participation in the wealth provides incentives that build motivation among staff to undertake value-building initiatives.

Lastly, when implemented, VBM clears and aligns goals of all firm's divisions. By outlining value creation as everyone's goal, providing consistent measurement system and binding it with relevant compensation, VBM provides common language for firm's employees and most importantly a mindset that drives the staff to work in the best interest of firm's owners.

1.2.2 Global Management Challenge

The Global Management Challenge - Strategy and Management Simulation is based on a realistic business situation, in which a number of virtual companies, managed by participating teams, compete against one another in a common business environment. A sophisticated and comprehensive computer

model simulates the interactions of various parts of each company, the competitive relationships between them and the background economic situation.

Although rules of the game seem fairly simple i.e. maximizing firm's share price, the ultimate success depends on so many factors, that it requires a holistic, comprehensive approach. Efficient management requires sound understanding of both the competitive environment, in which the company operates and firm's current market position, as well as firm's operational anatomy. Only deep expertise in those areas, enables creation of successful strategy, which supported by streamlined operational effectiveness may lead to the ultimate victory.



Figure 1.1: Tournament timeline

The communication with the simulator is held through two documents:

- Quarterly Management Report which shows company's performance in the quarter just completed,
- Decision Sheet, which provides an interface to the simulation engine, allowing decisions to be passed to the simulator.

The team starts managing the company in a certain point in time. In order to gain understanding of firm's current situation, the team receives five historical management reports, which directly precedes the starting point.

After the team gets familiar with the firm's history it has to make five consecutive decisions, at end of which firm's share price is taken as overall performance indicator. Decisions are made in between quarters, so there is no current - rather last and next quarters.

Figure 1.2 depics stock activity of four firms competing in Global Management Challenge. The simulation starts before the fourth quarter of 2005. At that point in time, the teams recieve four identical history management reports for five quarter from third quarter of 2004 through third quarter of 2005. As the figure illustrates, their performance is identical. Starting from fourth quarter of 2005,

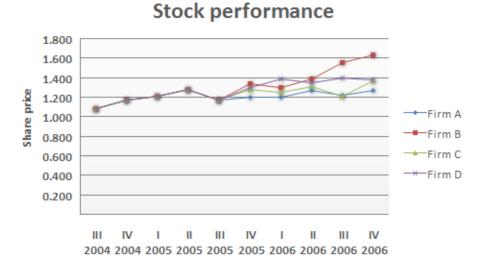


Figure 1.2: Stock performance

the teams take over control of the firms, which is expressed through differentiation of stock prices. Through five consecutive decisions, they compete for the highest price of shares at the end of 2006. In this case, firm B has won the simulation.

When a team submits a decision sheet, its decisions are simulated against decisions taken by other teams in a group within the business environment generated for the round. The results of the simulation are passed back to the team in the form of management reports.

Figure 1.3 presents a decision sheet that is used for passing decisions to the simulator. Figures 1.4 and 1.5 depict two page management report.

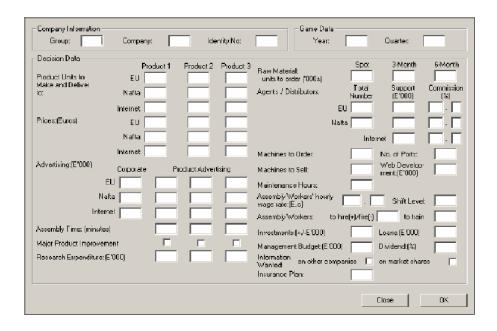


Figure 1.3: Management decision sheet

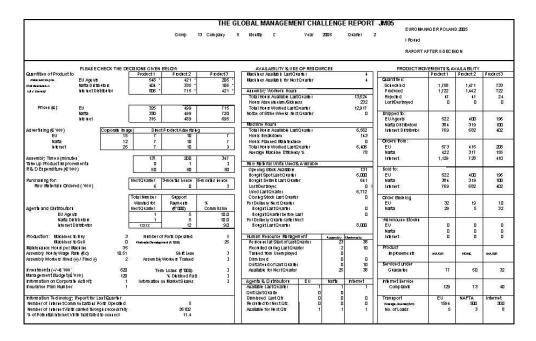


Figure 1.4: Management Report, side 1

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S									American bitshiesses claim that any improvement move from retrendiment into huestnent They say	

Figure 1.5: Management Report, side 2

Chapter 2

The Global Management Challenge

2.1 Business environment and economic background

The company operates in direct competition with a number of other companies, which manufacture and sell the same products in the same geographic areas. The company can make up to three products, which are not specifically defined. They are three different, but related types of consumer durables, which are generally thought to be desirable by the public.

The market is divided into two geographic areas for traditional trade:

- European market, where the trade is conducted in EUROs,
- North American Free Trade Area (NAFTA market), where the trade is conducted in US Dollars.

At the same time, the company is able to reach these areas and the rest of the world through the Internet. The company is in direct competition in all areas from other companies taking part in the simulation. There are also other companies involved in the competition, which means the market is wider than the one possessed by companies taking part in the simulation.

2.1.1 Economic Background

The sales in different geographic regions are affected by relevant demographic indicators, which constitute the nature and trends of the markets. All markets are affected by normal economic cycles of growth and decline; they cannot however be considered to reflect any present day situations, neither in economic nor political aspects. In other words, the world in the simulation is artificial, but based on economic principles.

2.1.2 Currency

All monetary decisions are taken in EUROs, even though trade is conducted in US Dollars in NAFTA and Internet. Therefore, the trade in the latter two markets is affected on EURO - Dollar exchange rate.

2.1.3 World Events

The company may be affected by significant world events e.g. cataclysms such as volcano eruptions or earthquakes, political upheavals or war, economic turbulence etc. Such events affect the entire economy, therefore having equal impact on all companies. Depending on company's risk exposure, the impact might be very serious, e.g. shortage of raw material or damage of company's machines.

External disruptions affect companies equally, but individual companies may deal with it differently, depending on the existence of relevant contingency plans incorporated into corporate strategy. It is management duty to conduct risk assessment and create adequate hedging strategies, that would safeguard company's core business.

2.2 Production and distribution

The production department is responsible for making and distributing products as effectively as possible, meeting the quality requirements set by the marketing department. The departments tactics have to be therefore aligned with company's marketing strategy both in the long- and short-term perspective. The three products that the company produces and sells are made in its own factory and of the same raw material. The production process comprises of two consecutive steps. Firstly, raw material is transformed into components on machines, each operated by four unskilled machinists, who are able to work shift-wise. Secondly, components are assembled and packed into finished products by skilled assembly worker, who only work single shift.

2.2.1 Raw material

All three products use the same basic raw material, in the following quantities:

	Product 1	Product 2	Product 3
Raw material content per product	$1 \mathrm{unit}$	$2~\mathrm{units}$	$3~\mathrm{units}$

Table 2.1: Raw material content per product

Raw material can be purchased in US dollars on the spot for immediate delivery, or can be ordered at the future market for three or six months delivery. Generally, material purchased at the future market is cheaper than the one on the spot, however advance transactions require estimates of the production volume and carry the risk of market failure in which the spot price drops below the past future price leading to losses. Reasonable raw material supply management emerging from accurate estimates of production volume leads to significant money savings. On the other hand, inaccurate forecasts or insensible buying lead to left-over of raw material, which procures additional warehousing expenses.

Raw material not utilized during the last quarter remains stored for the next quarter. The factory has its own warehouse in which it can store up to 2000 units of raw material facing a fixed administrative cost of maintaining the warehouse of \leq 12 500 per quarter. However in case the raw material stock exceeds the 2000 unit limit, the factory has to use a commercial storage, which charges \leq 2,50 for every single unit of raw-material, adding extra 70% to the raw material cost. Raw material purchased at the future market procures no storage costs as the delivery is done at the contract's matirity. Obviously, too optimistic forecasts leading to a stock of raw material spoils the advantage gained through the use of future market.

In case of shortage of raw material caused by erroneous estimates of production needs, required raw material is purchased automatically to satisfy the production plan. The purchase however is made at a premium price of an extra 10% of the last quarter spot price.

A transaction at the future market is made in US dollars using the rate from the last quarter and is invoiced immediately. The resulting liability is then divided into two even parts, which are covered in next quarter and the one after next. Both payments are made at the exchange rate quoted at the quarter before the transaction, therefore preserving the initial exchange rate. Additionally, raw material purchased at the future market for the future delivery is interpreted as firm's assets in next quarter's balance sheet (accrual approach).

2.2.2 Machining

The machining process is made on machines, each operated by four unskilled workers. The production capacity of the machining-shop depends on the number of machines that are possessed by the company and number of shifts, that machinists are decided to work. The capacity can be diminished by catastrophic events or machine failures, against which the company can insure.

Each type of product has its minimal machining time, which are presented in Table 2.2. These times

	Product 1	Product 2	Product 3
Minimum machining time per product	60 minutes	75 minutes	120 minutes

Table 2.2: Minimum machining time per product

suppose 100% new machine efficiency. As the machines get older, their efficiency drops, thus the machine times elongate. The process can however be slowed down by scheduled machine maintenance.

$$t = \frac{T}{e}$$

t - real machining time

T - minimum machining time per product (table 2.2)

e - machine efficiency

Shift level	Quarterly cumulative machine hours per shift	Unskilled workers needed
1	588	4
2	1092	8
3	1638	12

Table 2.3: Machine hours available for a single machine per shift

The machining process can be performed shift-wise, meaning that depending on production demand and a number of available machines, or management's strategy, the machines can operate at different shift levels providing different production capacity. The general principle is that the more shifts, the more expensive is the production, so by increasing the number of machines we can reallocate the production among more peers. However, purchasing new machines requires new capital and imposes additional operational costs, which leads to a trade off between the two. The costs and an optimal magnitude of production will be covered later in the report.

Machine maintenance and repair

Exploitation of machines leads them to use up. The process is inevitable, but can be slowed down by regular preventive maintenance. As a consequence, machines' efficiency decreases, lengthening machining processes required to produce a single product. The firm decides on its machines' maintenance on a quarterly basis.

Machine maintenance is carried out by external contractors, who, when scheduled, charge hourly rate according to Table 2.4.

Maintenance cost per machine, per hour	€ 85
Emergency maintenance cost per machine, per hour	€ 175

Table 2.4: Machine maintenance costs

In case of machine brake downs, whose repair time exceeds scheduled maintenance, the firm hires contractors who charge for their work at emergency rates.

The maintenance time scheduled for every machine should be subtracted from total hourly capacity of firms machine plant.

2.2.3 Assembling

The second stage of the production process is assembling, in which components are assembled into finished products and packed for shipping. Assembling is done by skilled assembly workers, who only work single shift.

Table 2.5 presents the minimum assembly time per unit. As the time a worker spends on assembly lengthens, the quality of the finished product increases, ipso facto building customers' satisfaction. At the same time, however, lengthening the assembly time of a single product decreases assembly-shop capacity and increases single item production cost, which shrinks the profit margin. Furthermore, too scant assembly time leads to an increase in rejections of finished products due to not meeting quality standards. Nevertheless, good quality of products brings customers' value, so generally is desirable and should be aligned with quality requirements set by the marketing department.

	Product 1	Product 2	Product 3
Minimum assembly time per product	100 minutes	150 minutes	300 minutes

Table 2.5: Minimum assembly time per product

After deciding on the time that should be spent on assembling a single unit of particular product, the assembly shop output depends on the number of assembly workers that are employed. The total assembly time, computed by multiplying planned product mix by corresponding assembly time of each product cannot exceed total assembly hours available. The available hours can be furthermore diminished by absenteeism due to strikes or illnesses. Assembly workers work only single shift with the maximum of 588 hours per quarter, which accounts for Monday-Sunday working dimension.

Generally the following condition has to hold:

$$\sum_{i} a_i x_i \le nA$$

 a_i - assembly time for product i

 x_i - scheduled production for product i

n - number of assembly workers employed by the company

A - maximum production time assembly worker can work

2.2.4 Quality and warranty

The firm owns a quality control department, which safeguards that products leaving the factory meet firm's quality standards. The products' quality is mainly influenced by the time firm's skilled workers spend on assembling and packaging of its products, but some unexpected faults can exhibit due to haphazard events such as undiscovered sub-standard raw material used in production.

The company offers one year warranty for its products. Inevitably some product sub-quality will remain undiscovered by the quality control and they will exhibit faults after being purchased. In such cases, servicing of products under guarantee is performed by firm's distributors, who charge the company according to fees listed in Table 2.6.

-	Product 1	Product 2	Product 3
Retail servicing cost, per unit	€ 60	€ 150	€ 250

Table 2.6: Retail servicing cost

It is possible that due to undiscovered design errors or sub-standard materials, faults are exhibited on large scale. Because of the scale, only 75% of normal costs are charged by servicing unit. In such cases, losses are included to the quarterly insurance claim.

Products that failed quality control are rejected and sold for scrap at prices given in Table 2.7. The quality control department has a fixed quarterly cost of $\leq 8\,000$.

	Product 1	Product 2	Product 3
Scrap Price, pre unit	€ 40	€ 80	€ 120

Table 2.7: Scrap price for rejected products

2.2.5 Production scheduling

The schedule of production is prepared for every product in every market for the entire upcoming quarter. The schedule should reflect sale forecasts of the marketing department and production capacity of the factory.

The production schedule should satisfy the demand forecast rendered by the marketing department diminished by any products left on stock and increased by outstanding backlog of orders from last quarter. It should also consider leaving some capacity margin as some products may be rejected by the quality control department and as a consequence remade to meet the schedule.

2.2.6 Delivery, distribution and warehousing

The quantities of products delivered to EU, NAFTA and Internet distribution units are stored in warehouses provided by the units, who additionally charge for the storage. Table 2.8 lists the storage costs charged.

	EU	NAFTA	Internet
Cost of storage per product unit	€ 3,50	€ 3,50	\$ 4,00

Table 2.8: Product storage costs charged by agents and distributors

Delivery to the agents and distributors is made in standard-sized containers provided by hired transportation firm. The capacity of a container is expressed in terms of quantity of products it is able to accommodate, as shown in Table 2.9.

	Product 1	Product 2	Product 3
Container capacity in terms of products	500	250	125
Standardized product sizes	1	2	4

Table 2.9: Container capacity

A single container can accommodate 500 units of product 1, 250 of product 2 and 125 of product 3. In

other words, one can assume that the container capacity is 500 standardized units, whereas product 1 occupies 1 unit, 2 - 2 units and 3 occupies 4 units of single container's capacity. Different mixes of products are possible but no matter what the container's load is, the carrier charges full-rate fee.

Daily all-in hire cost of container	€ 650
Distance to NAFTA shipping port	$250~\mathrm{km}$
Cost of container hire across North Atlantic	€ 8 000
Distance to Internet Distribution Agent	150 km
Legal distance limit per day on each vehicle	400 km

Table 2.10: Transportation parameters

Routes to Internet distribution agent and to NAFTA shipping port are of fixed length of 250 and 150 km respectively. Routs to Europe distribution agents are made as round trips and their lengths depend on the number of agents hired. The transportation costs within the NAFTA region are covered by NAFTA distributor.

2.2.7 Internet trade infrastructure

The online trade is made possible by the firm's web-site. The volume of online trade is seasonal, nevertheless the firm's IT infrastructure should be able to serve the peek loads, which is crucial to the firm's internet marketing image.

Access to the Internet is provided through a broadband network by an Internet Service Provider. The network capacity is expressed in terms to Internet "access ports", which the firm may purchase. The number of internet ports should reflect firm's internet traffic forecasts. Changes in the number of ports requires one quarter notice. Table 2.11 lists Internet operations parameters.

% of value of Internet sales as ISP's fee	3%
Initial cost of launching Internet operations	€ 7 500
Quarter cost per Internet access port	€ 1 000
Cost of closing down Internet operations	€ 5 000

Table 2.11: Internet operations parameters

Apart from proper connection bandwidth, the web-site requires constant development and maintenance outlays. Regular web-site disbursements, that are higher than competitors' build positive image

on the Internet market thus bringing competitive advantage. Firm's efforts appraisal is available as web-site star placed in management's report.

2.2.8 Management

Efficiency of production depends on mid-level management, which manages day-to-day factory operations. Reasonable management budget has positive impact on the quality of production management and indirectly on the factory's ability to meet production schedule.

2.3 Marketing

Firm's marketing department is responsible for building demand for and selling company's products in competitive markets. To accomplish the goal, it has to gain deep understanding of the markets, their trends and seasonal characteristics, their price sensitivity of demand etc. As a result of the analysis the marketing department builds short term and long term strategic plans which should construct the firm competitive edge against rival companies.

The firm sells its products in three markets: European Union, NAFTA and Internet. The Internet reaches the entire world so to some extend it interferes sales both in European Union and in NAFTA markets.

The company's wholesale trade is done through agents and distributors, who supply retailers in EU and NAFTA markets. The retailers sell company's products to the public. The trade on the Internet is held directly with customers through company's Internet website. Products purchased on the Internet and packed and shipped for delivery by company's Internet distributor.

The demand for company's products has seasonal nature and is driven by general market trends. These drivers are additionally influenced by marketing activities of company's marketing department and rival companies'. In order to produce and sell efficiently, the marketing department prepares demand forecasts, which are then used by production department for production scheduling. The demand forecasts should rely on economic and market information that is available in management report free of charge. The section containing free of charge information is shown in Figure 2.1.

BUSINESS INTELLIGENCE Free Information on Companies' Activity								
Company Number	1	2	3	4	5	6	7	8
Product 1: EU Price (€)	325	325	325	325	325	325	325	325
Nafta Price (€)	325	325	325	325	325	325	325	325
Internet Price (€)	310	310	310	310	310	310	310	310
Product 2: EU Price (€)	490	490	490	490	490	490	490	490
Nafta Price (€)	490	490	490	490	490	490	490	490
Internet Price (€)	480	480	480	480	480	480	480	480
Product 3: EU Price (€)	715	715	715	715	715	715	715	715
Nafta Price (€)	715	715	715	715	715	715	715	715
Internet Price (€)	695	695	695	695	695	695	695	695
Total Number Employed	61	61	61	61	61	61	61	61
Assembly Wage Rate (€.c)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Number of Agents/Distributors	2	2	2	2	2	2	2	2

Figure 2.1: Free of charge Business Intelligence information

Columns 1 - 8 represent rival companies that operate in the market. Intersecting cells represent respective information that is quoted in the first column. These include:

- product prices in different markets,
- workforce (aggregated number of skilled and unskilled employees),
- aggregated number of agents and distributors.

ECONOMIC INTELLIGENCE	EU	NAFTA	Rest of Developed World
Gross Domestic Product Last Quarter (deseasonalised)	5344	4436	27334
% Unemployment Rate Last Quarter (deseasonalised)	6.3	5	
Balance of External Trade Last Quarter	2831	-1995	
% Annual Central Bank Base Rate for Next Quarter	3.3	3.2	
Exchange Rate of 1 USD quoted in Euros, Next Quarter	0.97		
% Access of Population to PCs	50.0	60.0	28.0

Figure 2.2: Free of charge economic intelligence information

The report also contains free of charge macroeconomic indicators, as shown in Figure 2.2. These include:

- Gross Domestic Products of EU and NAFTA,
- Unemployment rates,
- Trade balance,
- Central Banks' annual interest rates,
- Exchange rate,
- Population's access to Internet,

which to some extend describes target economies.

The marketing department can purchase additional information, which helps gain deeper understanding of target markets. The business activity report (depicted in Figure 2.3) contain detailed information about competitors' advertising and Research & Development spending. It also shows subjective customer satisfaction levels expressed using star ratings, where one star is the lowest and five stars is the highest.

The information may serve as benchmark for company's managerial tactics.

Business Activity - Paid for Information								
Company	1	2	3	4	5	6	7	8
Total Advertising Spend (€)	99000	102000	116000	102000	127000	96000	112000	103000
Total Research Spend (€)	85000	90000	94000	70000	150000	83000	90000	80000
Consumer Star Ratings								
Product 1	**	**	**	**	**	**	**	**
Product 2	**	***	***	***	***	**	***	***
Product 3	***	***	***	***	***	***	***	***
Web-site Star Rating	****	****	****	****	****	****	****	****

Figure 2.3: Business activity report

The marketing department can additionally purchase market share information, which indicates company's participation in the market measure by the volume of trade. The report, as shown in Figure 2.4, provides market share by product, by market for each company, as a percentage of the entire stake. An important observation is that row-wise market shares do not sum up to 100%, which indicates that there's additional competition in the market. The report also indicates market's competitiveness determined by aggregated market share of largest players. Depending on the magnitude of the indicator, the marketing department should adopt relevant marketing strategy, as described in Porter's "Five Forces".

% of Market Share by Products Sold - Paid for Information									
Company		1	2	3	4	5	6	7	8
Product 1:	EU	4.6	5.4	4.0	4.9	3.5	4.3	2.3	1.2
	Nafta	4.6	5.1	4.1	5.7	3.4	6.0	5.5	5.7
	Internet	8.3	7.0	9.4	8.8	9.6	8.0	9,1	6.0
Product 2:	EU	4.6	5.0	4.1	5.1	4.6	5.0	4.1	5.1
	Nafta	4.1	5.5	4.4	4.8	4.1	5.5	4.4	4.8
	Internet	7.2	7.6	10.4	5.4	6.9	8.7	5.5	8.0
Product 3:	EU	4.4	7.4	6.4	5.9	4.4	7.4	6.4	5.9
	Nafta	4.7	5.4	8.3	7.6	4.2	5.3	8.1	6.7
	Internet	7.2	6.4	6.4	9.4	9.2	10.0	6.0	5.6

Figure 2.4: Market share intelligence report, paid information

Relying on the above business information, conclusions drawn from company's history, supported by microeconomic principles, the marketing department prepares a detailed marketing plan, which contains:

- Pricing policy,
- Product quality and design policy,
- Advertising policy,
- Agency and distributors policy,

- Internet trading policy and
- Availability policy.

The plan should be then confronted with other functional departments and against management's corporate strategy.

2.3.1 Pricing

As part of the its quarterly plan, the marketing department decides on the prices at which the company's products are going to be sold in different markets as shown in Figure 2.5.

Prices (€):	Product 1	Product 2	Product 3
EU	325	490	715
Nafta	320	485	710
Internet	310	480	695

Figure 2.5: Product prices per market

The price is the amount that the company is going to charge it agents and distributors for each unit delivered. It is also intended as a guide to price that should be charged by retailers. The prices for the Internet are directly applied to online customers. Additionally, the customers are charged delivery fees, which depend on the distance and are beyond the scope of company's decisions.

The agents and distributors are compensated in two ways: through a quarterly-fixed support payments and a commission, which is a linear function of the volume of sale. Everything else being equal, a reasonable level of commission, serving as a motivation factor, should drive company's sales.

All prices are set in Euros, regardless where the products are sold. In case of NAFTA and Internet, where the prices are quoted in USD, the Euro prices are transformed into USD using the exchange rated in management report. Since exchange rate fluctuate, the marketing department should revise its pricing quarterly to encompass potential exchange rate changes.

Price sensitivity of demand varies by market and product. In general demand for cheaper products is more prone to increase as price decreases, whereas demand for luxury products (product 3) is more price-resistant. However, slope of demand curve should be determined individually for every product in every market.

2.3.2 Product Quality

Quality of products is one of the fields, the company competes in. Good quality of products enhances marketing efforts by supporting product and corporate image. It also encourages customers loyalty. It can therefore be a differentiating factor in the market thus serving as company's competitive edge.

On the other hand however, high quality of products, achieved by extending assembling time, increases direct costs thus shrinking product profit margin. Lowering quality of products decreases operational costs enabling cheaper production and higher production capacity within available assembly resources. Lower production costs enable lower consumer prices, which according to economic principles should drive consumers' demand.

The two scenarios are known as Cost Leadership and Differentiation strategies, which have been introduced by Michael Porter among other generic strategies.

Quality savings may lead to serious product faults that turn out after purchase. Apart from bad influence on corporate image, faulty products impose additional costs due to product guarantee repair service.

Table 2.5 presents minimum assembly time per product.

2.3.3 Research and Development

Besides quality, innovation is one of the main fields of rivalry among competing firms. Innovative products provide differentiation from the market. It may be a new product design, new functionality or better usability - new features that attract new customers. It can also be production-wise innovation e.g. new material or process, which significantly reduces production costs. The improvements create competitive advantage which, everything else being equal, drive company's revenues.

The research and development (R&D) department is responsible for introducing innovative improvements to company's products. Every quarter the management decides on the magnitude of support it is willing to spend on R&D efforts. Their fruitful is unknown, but generally the more the company spends on innovation, the more probable success will be.

R&D expenditure is a long term, cumulative investment. In a short run there is no guarantee that the department would come up with an innovation, however the likelihood increases as the time horizon lengthens.

Product 1 Product 2 Product 3 Improvements MINOR NONE MAJOR

Figure 2.6: Quarterly Research and Development activity report

The results of efforts of R&D department are reported quarterly in management report, as in Figure 2.6. In the quoted quarter, the R8D department has introduced a minor improvement to product 1, no change to product 2 and a major improvement to product three. A minor improvement is implemented automatically and has immediate positive influence on sales. A major improvement is a technological breakthrough, which when incorporated, causes existing company's products obsolete. After a major improvement is decided to be implemented, existing stocks of old products are sold off at valuation price, which may be below production costs. In case a company has significant amount of existing products, the management may decide to stall the implementation, waiting for the stocks to empty, or to build up marketing campaign before the release. A major improvement usually drives consumers' demand.

Product innovativeness has strong positive influence on consumers' satisfaction ratings. Modern product line synergizes marketing efforts in building positive corporate and product images, thus driving demand.

2.3.4 Advertising

Advertising is company's main communication channel with its customers.

The company can use advertising in two purposes:

- Product image advertising and
- Corporate image advertising.

The former works short-term, building direct and immediate demand for particular product. Product advertising are usually Below-The-Line activities such as TV commercials or newspaper advertisements with scale depending on available funds.

The latter focuses on building corporate brand in particular region, regardless of products, aiming at creating customer loyalty and favor. Branding efforts are usually long term and cumulative, needing

steady, long term investments in order to be effective.

Strong brand attracts people to visit company's Internet website. This type of advertising is the main driver for the company's internet website traffic. Advertising targeted on the Internet, should be however supported by constant development and improvement, and appropriate traffic capacity of Internet website.

Firm's last quarter advertising expenditures are reported in management report as shown in Figure 2.7.

Advertising	(€ '000)
	EU
	Nafta
	Internet

Corporate Image	e Dire	Direct Product Advertising		
7	20	15	30	
7	20	15	30	
26	5	5	5	

Figure 2.7: Quarterly advertising spending

2.3.5 Markets

The company operates in the following markets:

- European Union,
- North American Free Trade Area,
- Internet.

Selling is done in two ways:

- Through retailers who sell company's products to customers,
- Directly to customers world-wide through the Internet.

World's statistics are presented in Table 2.12.

Demography	Area (sq. km)	Population (millions)
European Union (EU)	3 228 000	368
North American Free Trade Area (NAFTA)	$21\ 457\ 000$	278
Rest of developed World	44 120 000	2 486

Table 2.12: World statistics

European Union



Figure 2.8: World map, European Union depicted with blue

In European Union agents are hired to sell and distribute company's products. An agent is responsible for operating within a certain radius, so hiring additional agents extends company's reach. An agent is compensated by support payment, which covers basic operational expenses (e.g. accounting) and a commission, calculated as a percentage of agents sells, which constitutes agent's main source of income. The more he or she sells, the more he or she earns, so a reasonable level of commission should motivate an agent to sell more, increasing company's revenues.

North American Free Trade Area



Figure 2.9: World map, North American Free Trade Area depicted with blue

In NAFTA the company operates through distributors, each of which has its own network of retailers. In general NAFTA is more difficult to penetrate than EU due to longer distances, smaller population

and as a consequence lower population density. Furthermore, shipping products to NAFTA implies additional transportation and warehousing costs, which shrinks products profit margins. There's also the EURO-Dollar exchange rate risk. On the other hand, the NAFTA market with nearly three hundred million citizens is a large market, which may be seen as an opportunity.

Similarly to EU, NAFTA distributor is compensated by fixed support payment, which should cover basic operation costs and variable commission, calculated as a percentage of distributor's turnover. Raising distributor's commission should increase his motivation for selling.

The Internet

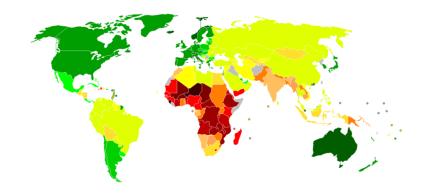


Figure 2.10: World map, development depicted with color intensity

The Internet provides a gateway for the global market of over 3 billion consumers (i.e. developed World only). The astonishing market is available partly only, due to limited access to the Internet of global citizens. The following table shows the effective market size of the Internet trade.

	EU	NAFTA	Rest of developed World
Population (million)	368	278	2 486
Access to the Internet (%)	50,0	61,0	28,0
Market size (million)	184	169,6	696

Table 2.13: Market size estimation

From the above calculation one can easily see, that the Internet market is of the size of 1 billion people. However, the Internet overtakes the traditional trade done through agents and distributors in EU and NAFTA markets.

The lack of middlemen (agents, distributors, retailers) in online trade reduces final costs of products, which leads to attractive consumer prices charged for the products on the Internet.

Apart from normal demand driving factors as product price, quality or innovation, attractiveness of company's e-commerce website, its traffic capacity and corporate image play important roles in online trade. Statistics for last quarter's online traffic are provided in management report as depicted in Figure 2.11.

Information Technology Report for Last Quarter	
Number of Internet Communications Ports Operated	5
Number of Internet Visits carried through successfully	35102
% of Potential Internet Visits that failed to connect	11.4

Figure 2.11: Quarterly Information Technology report

Packaging and dispatching of purchased products is carried out by Internet distributor, that the company hires. A single distributor handles entire online trade, for which the company pays him/her support payment (EU and NAFTA equivalent) and a commission. The magnitudes of these payments, which are subject to management decision, have no direct influence on online sells, rather influence distributor's efficiency and care.

2.3.6 Product availability

Every quarter EU agents, NAFTA distributors and Internet distribution agent order numbers of products. The company does not know exact numbers in advance, instead, relying on market expertise and historical data reported in management reports as shown in Figure 2.12, it makes estimates on what the demand would be. Following the estimates, the marketing department passes the figures to production department, which translates the forecasts to feasible production schedule. Manufactured goods are then shipped to middlemen, according to the plan delivered by marketing department.

Orders from:	Product 1	Product 2	Product 3
EU	594	397	232
Nafta	478	311	177
Internet	1,177	716	460

Figure 2.12: Last quarter orders report

Figures passed to production department should be previously updated by adjustments incorporating

- Adding orders backlog and
- Subtracting warehouse stocks,

which are reported by in management report.

Order Backlog	Product 1	Product 2	Product 3
EU	0	69	25
Nafta	0	29	15

Figure 2.13: Last quarter orders backlog report

Order backlog arises in case orders exceed product quantity delivered. The unsatisfied orders are passed to next quarter in the form of backlog. Usually 50% of uncompleted orders are abandoned, the other half is reported in the management report as shown in Figure XXX. On the Internet, orders that cannot be satisfied immediately, are definitely lost, therefore there's no backlog reported in the management report.

Warehouse Stocks	Product 1	Product 2	Product 3
EU	292	32	5
Nafta	464	40	0
Internet	124	12	11

Figure 2.14: Last quarter warehouse stocks report

Any overestimates of demand result in unsold products that have to be warehoused. The company is charged for commercial storage of its products.

2.4 Finance and accounting

Finance department is responsible for managing company's assets according to strategy established by senior management. That includes managing firm's capital structure, financing sources, equity and debt, investments, taxation, dividends, fixed assets etc. The department is also responsible for controlling as well as monitoring and maintaining firm's liquidity. It must work closely with firms' management to maximize company's share price, against which performance is measured. The stock price at the end of the simulation is the ultimate criterion by which companies' performance is judged.

ALL-COMPANY SHARE PRICE	S & DIVIDENDS							
Company Number	1	2	3	4	5	6	7	8
Share Price (€.c)	1.215	1.551	1.210	1.401	1.641	1.132	1.254	1.012
% Dividend Paid		2		3	2	3	4	3

Figure 2.15: Quarterly stock price report

The company is financed with shareholders' capital consisting of shares with the initial value of ≤ 1 . Company's shares are quoted on Stock Exchange; its share price is reported quarterly in management report. The share price is influenced by numerous factors, from which the main are:

- Firm's net worth,
- Profitability,
- Dividend performance,
- Liquidity,
- Ability to pay interest charges,
- Use and availability of resources,
- Marketing and selling capability,
- Ability to satisfy orders promptly.

2.4.1 Dividends

A dividend is a distribution of profits to firm's shareholders. A person or business that owns company's shares is eligible to receive a portion of company's earnings according to his share in company's equity.

Every odd quarter, the management needs to decide on the magnitude (percentage) of the payment. The residual of firms earnings after dividends are paid, become firm's retained earnings, that can be used to finance firms operations or investments.

A firm that has negative reserves must not distribute any dividends. Any profits generated by the company, are firstly used to cover company's negative reserves.

2.4.2 Investment

An investment is a sacrifice of today's consumption for the sake of future profits. A company invests its capital in order to receive future cash inflows.

Cash at hand yields no interests, instead due to inflation it looses value. In case a company has more cash than it needs for its operations in the upcoming quarter, it should invest the money at EU Central Bank base rate. The quarterly-binding base rate is quoted in Economic Intelligence section of last quarter's management report.

2.4.3 Debt

The second way a company can use to finance its operations is debt. A debt is an obligation to repay a sum of principal amount and interest payment.

A firm willing to finance its operations with debt has a variety of choices:

- Term loans,
- Flexible bank loans (overdraft),
- Unsecured loans.

Term loans are granted by investment institutions that are willing to commit their capital to the company in long term. The money is credited immediately and is available as cash or in case of any overdraft or unsecured loans, used to repay the obligations. The loans are long term and cannot be repaid during the simulation. The term loans are available at fixed annual rate of 12%.

Additional financing source is also available in the form of a flexible bank loans (overdraft). The maximum amount of overdraft is set by the bank based on firm's short term assets and liabilities shown in the company's balance sheet. The loan is available at EU Central Bank's base rate (e.g.

3%) augmented by 4%.

If the company needs more funds that its overdraft limit permits, it can continue to be funded by loans provided by finance houses, without security. Unsecured loans are continued to be granted even though a company is considered insolvent. Unsecured loans are available at EU Central Bank's base rate (e.g. 3%) augmented by 10%.

Flexible bank loans and unsecured loans are issued and repaid automatically as the firm's cash needs require. Overdraft is used in the first place. When the needs exceed the limits, unsecured loans are used to meet firm's needs. The debt is repaid in the reverse order - unsecured loans are repaid first, followed by the overdraft.

2.4.4 Fixed assets and depreciation

Fixed asset is a tangible or intangible capital such as property or patent, which is used in operations of a business, which is not intended to be consumed or converted into cash in the ordinary course of action in the nearest accounting period.

Company's fixed assets consists of property and machines owned by the firm. The value of firm's property is fixed and unchanging. As the machines get older, their value depreciates by the decreasing balance method at a quarterly rate of 2,5%. Depreciation is tax deducible.

2.4.5 Taxation

Company tax is levied on company's profit at 30% rate. An assessment of tax pending is made at the end of a calendar year. Any tax assessed is immediately deduced from company's net profit and is then entered as a liability on company's balance statement. Losses are accumulated from previous years and are offset against future profits.

2.4.6 Insurance

The company is exposed to risk from various random events, which can disrupt its operations. The events might be:

• Some or all of the raw materials held in your own warehouse can be accidentally destroyed by careless handling, theft, flooding or fire.

- Similar risks can destroy all or part of stocks of raw material in transit or in your own local warehouse.
- Key assembly workers, can suffer from serious home or workplace accidents which might disrupt your production capacity.
- Machines can suffer from catastrophic breakdown which takes them out of production for periods
 of time.
- Badly designed products can be distributed or sold which later are found to be environmentally dangerous, and need to be withdrawn for modification.

These events can be identified in management reports by "!" alongside relevant figures.

To hedge against such events, the company can purchase insurance, which in case of disruption covers company's losses. The degree of participation in losses of the insurance company depends on insurance plan, chosen by the insuring company. The higher the insurance level, the higher quarterly insurance premium, that the insuring company has to pay.

Insurance premium is calculated as a percentage of company's assets, taken from last quarter's balance statement:

- Property,
- Machines,
- Material stocks,
- Product stocks.

The value is then multiplied by a percentage, relevant to the loss the company is willing to accept itself, according to calculations conducted in Table 2.14 (suppose company has 3,34 million in relevant assets).

Global disruptive events are relatively rare, but when happening may cause serious losses. Another risk factor is the quality of management, which depends on management budget. Good management cares about working environment minimizing the risk of management-related losses.

Insurance plan number	Insurar	Insurance excess		ice premium
	[%]	[€]	[%]	[€]
0	100%	€ 3 344 583	N/A	N/A
1	$0,\!10\%$	€ 3 344	$0,\!60\%$	€ 20 067
2	0,20%	€ 6 689	$0,\!35\%$	€ 11 706
3	$0,\!30\%$	€ 10 033	0,20%	€ 6 689
4	0,40%	€ 13 378	$0,\!10\%$	€ 3 344

Table 2.14: Insurance excess and premium, according to insurance plan

2.5 Human resource management

Human Resources (HR) department is responsible for ensuring that the company has sufficient number of employees to function properly, that the workforce is adequate to the production strategy, and that the staff is well motivated and efficient. Employees are found in competitive labor market, in which the HR competes with other firms to hire required number of staff of highest quality. Proper supply of workforce is essential for the company to operate successfully. HR department should therefore monitor the labor market and company workforce needs so that management's strategy has suitable resources to be successfully accomplished.

Company's workforce consists of four kinds of employee:

- Unskilled machinists,
- Skilled assembly workers,
- Ancillary workers,
- Senior management.

The HR should be familiar with the labor market; its labor market expertise should serve as an important input when building expansion strategy. After the strategy is established, the HR department should take adequate steps so that required supply of staff is provided on time.

All employees may leave due to retirement, sickness or because they have gone to work for rival companies, that offered better employment conditions. The reasons for leaving are usually:

- Low average earnings,
- Excessive overtime working,

- Colleagues being dismissed,
- Poor quality of products,
- Poor management.

	Recruitment	Dismissal	Training
Unskilled machinists	€ 1 000	€ 2 000	n/a
Skilled assembly workers	€ 2 000	€ 5 000	€ 8 500

Table 2.15: Human Resources recruiting costs

2.5.1 Unskilled machinists

Every machine owned by the company requires four unskilled machinists to be operated per shift. Unskilled workers are hired and dismissed automatically, depending on company's current requirements which result from the number of machines that are owned by the company and the level of shifts decided for the quarter.

When a decision is made to sell a machine, the workers used to operate it are no longer needed. Due to the labor union agreement, dismissal of the surplus of unskilled workforce has to be done in two equal stages spanned over two upcoming quarters. As a result, in the next quarter half of the workforce being dismissed still is paid their normal salary.

2.5.2 Assembly workers

Skilled workers assembly components, produced on machines, into finished products ready to sell. The assembly process requires specific knowledge, that is provided to new employees during intensive initial training. Assembly workers are recruited from the competitive labor market. The firm compete with other firms to possess required workforce. The success of recruitment effort highly depends on current unemployment rate and conditions offered. If unemployment is low and conditions are relatively unattractive, the recruitment campaign may be unfruitful.

Addressing the above scenario, the company may decide to transform some of its unskilled staff into skilled assembly workers, by providing adequate professional trainings. Trainings take place in company's own school placed in the factory, which limits the number of people to nine per quarter. The trainings impose additional recruitment costs of $\leq 8\,500$ per worker, which is more than four time

more expensive than regular recruitment. However, this method of recruitment gives the certainty that required number of assembly workers is available in the quarter after next.

2.5.3 Ancillary staff

Ancillary staff works within the context of their corresponding departments. These include:

- Clerical staff,
- Accountants,
- Buyers,
- Warehouse staff,
- Researchers,
- Junior management,
- Etc.

Their duties result from functional roles of the department they belong to and their salary is included in fixed operational costs of the business unit.

2.5.4 Senior management

Company's senior management consists of a board of directors - besides CEO, executives responsible for firm's functional aspects:

- Marketing,
- Production and distribution,
- Finance and accounting,
- Human Resources.

Senior management is responsible for outlining firm's strategy and managing firms operations transforming the strategy into action.

Senior management is compensated by management budget, decided in each quarter. The budget influences its effectiveness in day-to-day management and achieving its goals.

2.5.5 Pay and workload limits

Besides recruitment, Human Resources department is responsible for controlling the cost of company's workforce simultaneously maintaining it motivated. Every quarter, the management decides on the level of wages paid to the company's workers. Basically, wage rate of a machinist is 65% of assembly worker's rate. Apart from wage rate itself, the workload (overtime and shift level) has significant impact on company's cost of workforce. Table 13 shows single employee's work limits.

Shift level	-	Hours per worker at Saturday rate	Hours per worker at Sunday rate	Machinists Shift
	basic rate	$(Basic\ pay\ +\ 50\%)$	$(Basic\ pay\ +\ 100\%)$	premium
1 (single)	420	+84	+84	0
2 (double)	420	+42	+84	1/3
3 (triple)	420	+42	+84	2/3

Table 2.16: Employees' workload limits, according to shift level

When working single shift, an employee can work 420 hours quarterly for a basic salary rate. Any excess of this limit within available 168 hours is charged additional 50% or 100% of the basic rate. When the management decides to introduce additional shifts (applies to machinists only), basic pay is augmented by relevant shift premium, shown in table 13. The shift premium applies to the basic pay of all machinists. As a result, the basic pay of a machinist working 3 shifts, compensated by 2/3 shift premium is nearly 10% higher than a basic rate of an assembly worker.

Chapter 3

Value-Based Management

The following chapter describes the concept of Value-Based Management. It introduces the reader to financial statements analysis and valuation in order to gain necessary background for VBM. It then provides detailed explanation of the concept of Economic Value Added and guides through the technicalities of the metric.

3.1 Economic Value Added - Introduction

Economic Value Added arises from microeconomics and finance theory. The concept relies on the work of Nobel Price winners - Merton H. Miller from the University of Chicago and Franco Modigliani from MIT. Miller and Modigliani promote economic model of a firm and discounted cash flows for valuation of current wealth throughout managerial decision process. Joel M. Stern states that the findings of Modigliani and Miller "constitute the basis for development of the concept of Economic Value Added, which provides a practical solution for performance measurement and management compensation system, driving managers toward behavior that is convergent with shareholders' interest."[2]. The concept has been clearly defined and popularized by $Stern\ Steward\ \mathcal{E}\ Co$, who registered EVA as its trademark.

Residual income used in accounting is the Net Operating Profit After Tax, also known as the bottom line. According to accountants, it is the ultimate measure of company's operational profit. Value-Based Management and Economic Value Added theory in particular criticize the approach, claiming that firstly it distorts the true profit generated by company (Stern Steward names over 120 distortions of profit expressed through NOPAT), secondly, neglects certain costs of capital providers. The theory claims, that in order to capture the true profit of a company, one needs to incorporate economic principles to the measurement methodology, more specifically incorporate the opportunity

cost of capital providers. Peter Drucker in his article in Harvard Business Review from 1995 writes: "Economic Value Added relies on principles, we have known for long: what we call profit, money that is left (...), isn't usually any profit. As long as an enterprise does not generate cash that exceeds its cost of capital, it generates loss. It does not matter that it pays taxes as if it generated true profit. Such enterprise still returns to its environment less than it takes in the form of resources. (...) It doesn't add wealth, rather it destroys it."[3]

Economic Value Added as a measure of company's performance measures company's residual income. For the income to be positive, company's operational profit must compensate risk incurred by capital providers. Consequently, when operational profit equals expected rate of return, company's residual income equals zero.

3.2 Financial statements

Publicly traded companies are obliged to publish certain information to its shareholders and/or general public. The information should provide its addressee with information about firm's current financial condition. In order to maintain consistency, governments impose certain accounting rules for preparing the statements. These are called Generally Accepted Accounting Principles (GAAP). Since there were differences in GAAPs between countries, international comparison of companies has been problematic. Addressing the inconsistencies, International Accounting Standards Board has developed International Financial Reporting Standards, which have already been adopted by many countries (including European Union and Australia). The United States Federal Accounting Standards Board has made a commitment to converge US GAAP toward IFRS [4].

International Financial Reporting Standards provide a number of financial reports for describing firm's state from different angles in generally acknowledged formats. The four main financial statements are:

- Balance sheet,
- Profit & loss statements,
- Cash flow statements and
- Shareholders' equity statements.

If a company has extraordinary items that affect the balance sheet or the shareholders equity position it will usually include an Other Comprehensive Income Statement, which describes the adjustments to be made. Examples of Other Comprehensive Income include revaluation of corporate assets away from their stated cost, as well as accruals for liabilities.[5]

Investors considering the purchase of firm's stock have rather limited information about the firm. Therefore investors' decisions are based on financial statements.

3.2.1 Balance Sheet

Balance Sheet is a statement of the book value of the business, providing a report of firm's financial position. It is a report prepared at the end of an accounting period, serving as a snap shot of firm's financial condition at a given point in time. Figure 3.1 depicts an example balance sheet.

A balance sheet consists of three parts:

Balance Sheet		
Assets		
Value of Property	100 000	
Value of Machines	1 046 444	
Total Fixed Assets		1 146 444
Value of Product Stock		0
Value of Raw Material Stock		4 086
Debtors		761 288
Cash		1 482 451
Investments		80 000
Total Assets		3 474 269
Liabilities		
Tax Assessed & Due		88 638
Creditors		324 150
Bank Overdraft		0
Unsecured Loans		0
Total Current Liabilities		412 788
Net Assets		3 061 481
Term Loans		500 000
Net Worth		2 561 481
Share Capital		4 000 000
Reserves		-1 438 519
Shareholders Funds		2 561 481

Figure 3.1: Balance Sheet

Assets constituted by things that the company owns that has some value. They can be either converted to cash (i.e. sold) or used by the company to provide services or make products that can be sold. These can be tangible assets: property, machines, inventory; or intangible: trademarks, brands, patents. Furthermore, there are current assets i.e. assets easily convertible to cash e.g. inventories, accounts receivables, short-term investments; and non-current or fixed assets i.e. assets not intended for resale e.g. property, real estate, goodwill, long-term investments etc.

Liabilities constitute company's obligations toward others. These can be bank loans, rent, money owed to suppliers for materials, payroll a company owes to its employees, taxes owed to the government. Liabilities also include obligations to provide goods or services to customers in the future.[6]. Similarly to assets, liabilities can be current i.e. debt and obligations that a company is expected to pay within 12 months e.g. accounts payable, tax, short-term bank loans; and non-current, or fixed i.e. debt and obligations that a company is expected to pay beyond 12 months e.g. mortgage bonds, lease obligations, provisions.

Shareholders' equity is the capital that would be left over if all assets were sold and all liabilities were paid off. The capital belongs to shareholders, or owners of the company. It is also known as the net assets, or net worth of the company. Share capital, capital reserves and retained earnings constitute shareholders' equity.

For every balance sheet relation 3.1 must hold.

ASSETS = LIABILITIES + SHAREHOLDERS' EQUITY
$$(3.1)$$

In other words, the assets have to balance firm's liabilities and shareholder's equity. It is called the basic accounting equation.

3.2.2 Profit & Loss Statement

Profit & Loss statement, or Income Statement in the US, provides a statement of results of firm's operations expressed in terms of profit and loss in quoted accounting period. Figure 3.2 depicts an example income statement.

Income Statement	
Sales Revenue	1 713 995
Opening Stock Value	38 023
Materials Purchased	215 334
Assembly Wages	162 092
Machinists Wages	338 278
Machine Running Costs	107 058
Quality Control	8 000
Minus Closing Stock Value	4 086
Cost of Sales	864 699
Gross Profit/Loss	849 296
Insurance Receipts	22 676
Interest Received	659
Interest Paid	15 000
Overheads	723 870
Depreciation	26 832
Tax Assessed	0
Net Profit/Loss	106 929
Dividends Paid	0
Transferred to Reserves	106 929

Figure 3.2: Income Statement

A profit & loss statement shows how much revenue has a company generated over a specific time period. It also shows the costs and expenses associated with earning the revenue.[6]. It therefore enables investors and creditors to evaluate past performance of the company, predict future performance and assess the risk of achieving future cash flows.[7]

A P&L statement has also some limitations. The statement depends on the accounting method used (inventory statements may differ depending on using Last In First Out or First In First Out reporting methods).

An important remark is that profit and loss statements should not be understood as statement of company's cash at hand. The statement uses memorial accounting and reports any accruals as capital actually possessed. Since most businesses uses delayed payment i.e. paying for good or services with

some-day delay; the statement may report funds, which the company hasn't received yet. Obviously, it carries the risk of counter party payment default.

P&L statement carry significant information, which enables financial analyst to evaluate firm's performance. The statement starts with Gross Revenue, which represents all inflows or enhancement of enterprise' assets due to its operations i.e. selling products or services. The amount carry no information about any expenses. The second main section on a P&L statement represents company's expenses. These can be:

Cost of goods sold represents firm's expense incurred through production of goods or performing a service. These costs are considered variable, since they are directly dependent on the magnitude of production,

General and administration expenses represent costs incurred through business management and administration. These costs are considered fixed, as they do not directly depend on the magnitude of production. These costs include salaries, insurance, rent, lease, etc.,

Selling expenses represent firm's expenses incurred in order to sell products. These include distributors' support payment and provisions, advertising, transport and shipment etc.,

Research & Development represents expenses incurred through firm's R&D activities,

Depreciation represents costs associated with depreciating assets.

The expenses are followed by non-operational gains or expenses. These cash flows result from other than primary business activities (e.g. interests received and paid, rent etc.).

3.2.3 Cash flow statement

Cash flow statement shows firm's inflows and outflows of cash or cash-equivalents in a period under query. The statement reports how changes to the balance sheet due to activities represented in P&L affect current firm's cash condition.

The statements breaks the changes down to three sections

- operating activities,
- investing activities and
- financing activities.

Income statement item	Acronym spelled out	Alternative terminology
Revenues		Sales, Income, Turnover
- CoGS	Cost of Goods Sold	Cost of sales
EBITDA	Earnings before I+T+D+A	Gross margin or profit, Operating margin
- Depreciation		
- Amortization		
EBIT	Earnings before I+T	
- Interest		Financial income, Financial expense
EBT	Earnings before Taxes	Pretax net income
- Taxes		
E	Earnings	Net income

Table 3.1: Financial terminology with explanation[7]

Cash Flow Statement	1 719 241
Trading Receipts	
Capital Receipts	0
Interest Received	659
Investments Sold	0
Insurance Receipts	22 676
Additional Loans	0
Trading Payments	1 545 339
Capital Payments	0
Interest Paid	15 000
Investments Bought	0
Tax Paid	0
Dividends Paid	0
Loans Repaid	0
Net Cash Flow	182 237

Figure 3.3: Cash flow statement

Operating activities report changes imposed by production, sales and delivery of company's products accounting counter party payments. Activity section of a Cash flow statement would report:

- Net income from income statement,
- Depreciation,
- Tax,
- Wages.

Investing activities report purchases or selling of long-term assets. These are:

• Capital expenditures, e.g. purchases of equipment,

• Investments.

Financing activities report flux of cash to/from investors such as banks and shareholders. These are:

- Dividend activities,
- Issuing and purchasing of new stock,
- Issuing and purchasing of debt.

3.2.4 Shareholders' equity statement

Shareholders' equity statement, also known as the statement of retained earnings, reports changes to enterprise' equity in accounting period under query. It breaks down changes affecting the account, such as profits or losses from operations, dividends paid, and any other items charged or credited to retained earnings.[8] The statement has to be consistent with P&L and balance sheet statements, thus equation 3.2 must hold.

Ending Retained Earnings = Beginning Retained Earnings + Investments
$$-$$
Dividends paid + Net Income (3.2)

3.3 Valuation

Investments are one of the main functional areas within enterprise operations. Within a free market, they are the necessary condition of enterprise growth. No matter if it is an enterprise developing new product line, or an investment fund speculating on a stock market, in both cases it is a commitment of cash. According to the definition, it is the current sacrifice for the sake of future profits. Furthermore, it is a sacrifice of certainty for uncertain tomorrow. Investment is resignation of current consumption. In other words, when an investor makes an investment, he or she commits capital, preventing it from any other utilization. The reason he does it, is because he believes rightly or wrongly that he will receive more cash in the future. The time value of money, however, prevents from the ability of simple comparison between money as of today and money in the future.

Since an investment freezes cash, its value depends on the magnitude of future cash flows that the investor acquires right to. Free cash flow is an amount left over from company's operating activities. That residual cash is the source of capital returned to capital providers. Free cash flow enables companies to pay interest and principal on loans, distribute dividends and buy back shares. These are the ways companies return cash to their capital providers. Consequently, expectation of cash flows will be the paramount determinant of company's value from capital markets perspective.[9] Table 3.2 provides the calculation path for arriving at company's free cash flow.

EBITDA

- Depreciation and amortization
- Taxes

Net Operating Profit After Tax (NOPAT)

- + Depreciation and amortization
- Capital expenditures
- Changes in the working capital requirement (WCR)

Free cash flow

Table 3.2: Calculation of free cash flow

Valuation estimates the worth of right to future cash flows generated by an investment. It is a function of three main factors: magnitude, time and uncertainty. The magnitude carries information about the size of future cash flows. The number however means little unless one knows the time horizon of an investment, due to the nature of cash ¹. Even though magnitude and timing are known, there is the risk of an investment not going according to the plan. Only by knowing the magnitude, timing

¹Time value of money.

and uncertainty one can perform a comprehensive valuation.

3.3.1 Discounted Cash flow

The above insights are captured in the discounted cash flow (DCF) valuation model. With this approach, expected future cash flows are discounted at a discount rate that reflects both uncertainty of an investment and time an investor is expected to wait. The model is represented by formula 3.3.

$$Value = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$
(3.3)

n - life of the investment

 CF_t - projected cash flow in period

r - riskiness of the cash flow

DCF states, that the value of an investment is the sum of discounted future cash flows, with the discounted value of each cash flow being a function of nominal magnitude, risk and timespan of the investment. The discount rate is the return an investor would expect to receive if he committed the capital elsewhere bearing similar risk.

Expected future free cash flows are discounted using formula 3.3 in order to arrive at investment's Net Present Value.

3.3.2 Net Present Value

Net Present Value (NPV) is one of the fundamental decision criteria for many companies. It counts among discounting investment valuation methods. It takes under consideration any inflows and outflows generated by an investment spanned over the entire investment's timespan.

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - I_0$$
 (3.4)

r - investor's expected rate of return

n - investment timespan

 CF_t - expected cash flow in period t

 I_0 - initial capital expenditure

3.3.3 Internal Rate of Return

Another of the most frequently used discounting valuation methods is the Internal Rate of Return (IRR). IRR is such rate of return, which balances capital expenditures with discounted value of future free cash flows generated by the investment. Thus, the Internal Return Rate is a rate at which investment's Net Present Value equals zero.

PV(Capital expenditures) = PV(Free cash flow)

Formula 3.5 represents the Internal Rate of Return valuation model.

$$\sum_{t=0}^{n} \frac{\text{CF}_t}{(1 + \text{IRR})^t} = 0 \tag{3.5}$$

n - life of the investment

 CF_t - expected cash flow in period

In practice, Internal Rate of Return of an investment is its return rate. If IRR exceeds cost of capital engaged, then the cash surplus is accumulated by the company, increasing its economic value. Consequently, it is the wealth generated for the firm's shareholders.

The following example demonstrates calculation of NPV for a 5-year investment, with an initial capital requirement of ≤ 1000 and working capital requirement constant over 5 year of ≤ 1500 . Table 3.3 illustrates the problem.

Applying formula 3.4:

$$NPV = \frac{500}{(1+0,1)^1} + \frac{600}{(1+0,1)^2} + \frac{700}{(1+0,1)^3} + \frac{800}{(1+0,1)^4} + \frac{2400}{(1+0,1)^5} - 2500 = 1012,9$$

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
EBITDA		500	600	700	800	900
- Capital Expenditures	-1000					
- Changes in the WCR	-1500					1500
Free cash flow	-2500	500	600	700	800	2400

Table 3.3: Free cash flow example

The Net Present Value of the investment is € 1013, which means that it is expected to generate return greater than its cost of capital. It is the wealth generated for the shareholders.

Solving equation 3.5 for the above example, the IRR rate equals 21,2%. Provided the hurdle rate is equal to discount rate used in NPV calculation, IRR analysis leads to the same conclusion, namely that the investment generates free cash flows that exceeds cost of that capital.

3.4 Value-Based management

Value based management instills a mind-set, where everyone in the organization learns to prioritize decisions based on their understanding of how those decisions contribute to corporate value.[9]

Both the NPV and IRR analysis are forward-looking i.e. they rely on expectations of the future, not on what company has delivered in the past. The approach seems reasonable, since investors commit their capital to NPV positive initiatives. It however lacks appropriate performance metrics that would evaluate management's progress in achieving its goals.

Management is evaluated and rewarded based on its results (backward-looking), while capital markets perform valuation of businesses and investments on the basis of expectations of the future (forward-looking). These opposite-looking approaches cause the risk of management being compensated for irrelevant from the value-creating perspective activities, that it undertakes. To address the threat, companies should adopt performance measurement techniques that are conceptually linked with the free cash flow model of valuation. In other words, corporate managers should be evaluated in a manner that is consistent with the way that the capital markets will evaluate their firms.[9] One of such metric is Market Value Added (MVA).

3.4.1 Market Value Added

Market Value Added is by some VBM practitioners considered the most important of all value-based metrics. MVA is calculated according to formula 3.6.

$$MVA = market value - invested capital$$
 (3.6)

Market value added is the difference between market value and the total capital invested in the enterprise. The former of the two is a market value of all capital claims held against the enterprise, namely it is the market value of its debt and equity. The latter, is the capital invested in the business by its capital providers. Both of these values should be of the same point in time.

MVA is considered the ultimate measure of value created since it provides the difference between the inflow and outflow of cash i.e. between capital that has been committed by investors and the amount that they can receive when selling the enterprise for its current market value. In this matter, Market Value Added is the accumulated amount by which the firm has increased or decreased shareholders' wealth.[2]

An important remark regarding stock valuation is that stock prices only reflect market's expectations toward the joint-stock company. The price depends mainly on financial results that investors expect it to achieve. Former financial results do matter however, in a way that they act as expectations stimulating factor toward future results. Consequently, valuation of a joint-stock company is a function of cash, that investors count on, rather than capital that has been committed. Al Ehrbar captures this approach by saying that on stock-exchange no one asks "What have you done for me lately?", but rather "What are you going to do for me tomorrow?". Market value in that sense captures market assessment of management's efficiency in utilizing resources. It also reflects market's assessment of management's strategy and efforts in ensuring future enterprise prosperity.

Obviously, a firm is value creator, when its enterprise value which is capital market expectation of its future free cash flows discounted at the cost of capital exceeds that capital i.e. MVA is positive. The firm destroys value if its market value is lower than capital invested. This relation is presented in figure 3.4.

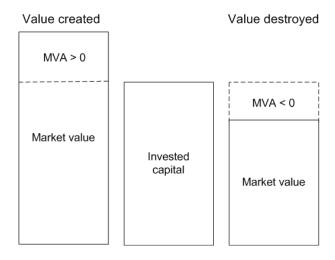


Figure 3.4: Positive and negative Market Value Added[15]

As an expectation of future cash flows, Market Value Added constitutes stock market's assessment of firm's value i.e. its Net Present Value. It is the present value of future cash flows, discounted using firm's cost of capital. Not surprisingly, from capital market perspective, the profits should represent gains incorporating cost of capital committed in the investment.

Market Value Added is therefore the current value by which future profit exceed their cost of capital. In other words, the profit captured by MVA is of economic nature i.e. is the difference between

operating profit and the cost of capital. The insight is exactly captured by Economic Value Added. The MVA-EVA relation is captured by equation 3.7. [16]

$$MVA = \sum_{t=1}^{\infty} \frac{EVA_t}{(1 + WACC)^t}$$
(3.7)

3.4.2 Economic Value Added

Wealth is created when operating profitability of a firm exceeds cost of capital engaged. The ability and magnitude of wealth created is measured by Economic Value Added. EVA enables performance evaluation over period of time, simultaneously being aligned with the manner in which capital markets evaluate businesses. It is calculated using formula 3.8.

$$EVA = NOPAT - CC (3.8)$$

NOPAT - Net Operating Profit After Tax CC - Capital Charge

Economic Value Added is the difference between after-tax profit the company has generated from its ongoing operations and capital charges, which charges invested capital with an economic cost of that capital.

The economic nature of EVA constitutes its fundamental premise toward creation of shareholders' wealth. "The principal difference between EVA and more conventional profit measures is that EVA is an "economic" as opposed to an "accounting" profit. It is based on the idea that for a business to earn what economists call "rents" (i.e. abnormal returns on investment), revenues must be sufficient to cover not only all operating costs but also all capital costs (including costs of equity finance). Without the prospect of economic profits, there can be no wealth creation for investors."[9]

Firm's market value is established by capital markets by augmenting invested capital with present value of firms future prospects (formula 3.9).

Market value = invested capital + present value of future EVAs
$$(3.9)$$

By combining equations 3.6 and 3.9 one arrives at formula 3.7, that is

Market value added = present value of future EVAs

Consequently, when companies implement strategies or invest in projects that are expected to deliver increased streams of future EVAs it results in increase in MVA and excess return i.e. creation of shareholder wealth.

3.5 EVA technicalities

Economic value added is firm's net operating profit reduced by cost of capital involved. This insight is expressed with the formula

$$EVA = NOPAT - invested capital \times WACC$$

It is therefore, firm's profit incorporating the opportunity cost i.e. cost of lost opportunities.

3.5.1 Net Operating Profit After Tax

NOPAT, company's operating profit, net of tax, measures profits the company has generated from its ongoing operations. Table 3.4 shows the way to arrive at NOPAT.

Operating income
+/- Equity income or loss
+ Other investment income
- Income taxes
- Tax shield on interest expense

Net Operating Profit After Tax (NOPAT)

Table 3.4: Calculation of NOPAT

According to Stern Stewart, NOPAT carries long number of distortions due to its accounting origin. Generally Accepted Accounting Principles impose accounting mindset, which leads to misrepresentation of company's financial results in terms of economic principles. Addressing that, NOPAT requires adjustments, which streamline calculations, revealing firm's true economic profit.

Stern Stewart claims that they know more than 120 adjustments that need to be incorporated to calculations when seeking for firm's operating profit. [2] Applicability of those adjustments depends on the nature of business in question. Different approach should be adopted when dealing with high-tech venture capital start-up, than with large enterprise operating within well-established market. There are however publicly acknowledged adjustments that should be universal to all enterprises.

Research and development

Research and development expenses are investments in future products and processes. Generally Accepted Accounting Principles impose R&D expenses to be immediately recognized as operational

costs. It has tremendous effect in case of high-tech companies, which commit much capital in innovation. Recognizing research and development expenses as operational costs reduces their accounting value to nil, neglecting the invaluable asset.

EVA practitioners suggest capitalizing research and development costs (recognizing them as an asset in the balance sheet) and amortizing them throughout a reasonable period. Work of Baruch Levy suggest that amortization period varies from three to four years in case of scientific instruments, up to at least eight years in case of pharmaceutical industry.

Strategic investments

Strategic initiatives are investments, which in the long-run are thought to build firm's competitive advantage. Using standard approach, although in the long-run the project may be profitable, the investment's capital requirement and long return horizon may decrease current EVA generated by the company, leading the project to be rejected.

Stern Stewart suggests that instead of charging strategic investments with the cost of capital from day one of the project, firms should move the investments into special accounts, which would not participate in calculation of Economic Value Added. The account should then be augmented by the accrued cost of capital until the investment is finished.

Costs recognition

Generally Accepted Accounting Principles impose certain expenses to be recognized as costs immediately when incurred, even though their effect is long-term. Advertising and firm's marketing efforts are examples.

Analogically to R&D expenditures, EVA practitioners suggest capitalizing the expenses and amortizing them over appropriate time period.

Amortization

In some cases it is advised to apply progressive amortization method, which is more close to assets real depreciation.

Restructuring deductions

Restructuring deduction is accounting acknowledgment of firm's loss due to an unsuccessful investment. GAAP requires any restructuring deduction to be acknowledged as loss. For this reason, in-

vestments generating no accounting profit may be kept alive even though they destroy value from economic perspective (i.e. the profit they generate does not exceed cost of capital committed).

Applying EVA perspective, restructuring is considered an opportunity that should be used, whenever available, since it focuses on the ultimate, shareholders' profit (as opposed to accounting profit).

Balance sheets adjustments

Earnings generated by companies are distributed to shareholders in the form of dividends or are kept by the companies as retained earnings. The capital retained is either kept as cash reserve or in the form of liquid financial instruments, that can be easily converted to cash. The capital does not participate in firm's operating activities, therefore is not expected to generate operating profit.

EVA approach suggests valuating them using lower capital cost related to financial investments, instead of using firm's weighted-average cost of capital used for financing of operating activities. Furthermore, EVA practitioners suggest subtracting return from capital investments from firm's operating profit after tax.

3.5.2 Corporate finance

A company willing to expand its operations needs capital for the investment. When deciding on its financing, the corporate finance specialist can choose from an array of alternatives, which ultimately reduce to:

- equity,
- debt.

The combination of the two above constitutes firm's capital structure. Brealey and Myers define firm's capital structure as the structure of securities issued by an enterprise distinguished between debt and equity securities.[11] Firm's capital structure is therefore expressed by the right side (liabilities) of its balance sheet, as depicted in figure 3.6. Firm's debt can be either short-term i.e. bank loans or money market instruments, or long-term i.e. fixed- or floating-rate bonds or bank loans. Firms equity is constituted by its seed capital (capital brought when an enterprise is born), reserves and retained earnings (profit generated in previous periods, that has not been distributed in the form of dividends).

According to Modigliani and Miller the most important characteristic of debt as a component of enterprise capital structure, is so called *Tax Shield* that debt provides. Interest rate on debt are financial costs, which decrease firm's taxation base.[12] Another significant distinction of debt is the risk of

default. Debt's interest rate and payment date impose the risk of company being unable to cover the payment. Financial benefits due to the tax shield can be smoothed away by the cost of bankruptcy in case of debt repayment default.[13]

	Debt	Equity
Financing horizon	The capital is provided by creditors	Capital is provided by shareholders
	for explicitly time defined in an	without return date defined.
	crediting agreement.	
Payments	Interests payments and repayment of	Dividends are paid to shareholders
	principal are made to creditors	according to firm's financial
	according to credit agreement.	capabilities (net profit)
Taxation	Interests payments are firm's	Dividends are paid from after-tax
	financial costs, decreasing taxation	profit, generated by the firm, thus
	basis for Corporate Income Tax.	are not costs decreasing taxation
		basis for Corporate Income Tax.
Control	Creditors have no control over the	Shareholders have voting right -
	enterprise, unless differently stated	they participate in making most
	in credit agreement.	important decisions.
Bankruptcy risk	Default in payment of interest or	Default of payment of dividends
	principal may be the basis for firm's	may not be the basis for firm's
	bankruptcy.	bankruptcy.

Table 3.5: Debt and equity comparison[15]

The subject of mutual relations of benefits and detriments of debt vs. equity and the seek for optimal capital structure of an enterprise is known as the *trade-off theory of capital structure*. [14] The theory relies on the model proposed by Modigliani and Miller.[12] According to the theory, for every enterprise, there exists an optimal debt - equity ratio, for which value of the enterprise is maximized. In that case, balance of benefits due to the tax shield and costs due to the risk of bankruptcy reaches optimality.

Enterprise' capital structure can be defined with a number of financial indicators. The fundamental is the financial leverage ratio, which defines ratio between debt and equity in corporate capital structure. The ratio, also known as the debt-equity ratio, has been used by Modigliani and Miller in their model.[12] Leaving capital structure optimality aside, changes in the structure cause different capital markets' reactions. General capital transactions and their influence on capital markets are compiled in figure 3.5.

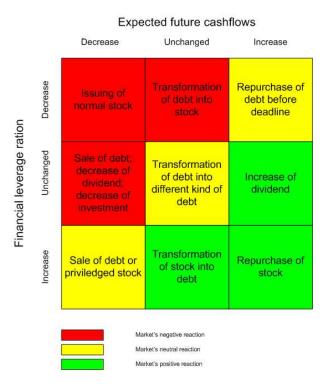


Figure 3.5: Financial markets' reactions for capital transactions[15]

3.5.3 Invested capital

Invested capital represents all of firm's interest-bearing financing, that is:

- Equity,
- Short-term debt,
- Long-term debt,
- Other long-term liabilities.

The above financing according to the balance equation of accounting (equation 3.1) is materialized or balanced in the form of company assets. This equality is depicted in figure 3.6. Company's assets (Cash, WCR and Fixed assets) are balanced by company's liabilities and equity (debt and equity).

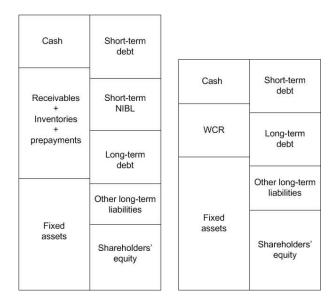


Figure 3.6: Regular and EVA Balance Sheets

When calculating EVA, invested capital does not take under account short-term, non-interest bearing liabilities such as accrued wages, accrued taxes, accounts payable. They are excluded from the

calculations since their sources claim no interest.

```
Invested capital = excess cash + WCR + fixed assets

= total assets - short-term non-interest-bearing liabilities

= short-term debt + long-term debt

+ other long-term liabilities + shareholders' equity
```

The formula is consistent with EVA balance sheet, which is depicted on right side of figure 3.6.

3.5.4 Weighted-Average Cost of Capital

Weighted-Average Cost of Capital represents the capital cost, which the company is charged with for its financing. The number is an average of costs of different sorts of capital committed. It therefore represents the cost of lost opportunities, or the economic opportunity cost, that investors incur, when they commit their capital to the firm. Weighted-Average Cost of Capital is calculated according to formula 3.10

$$WACC = w_d C_d + w_e C_e \tag{3.10}$$

 w_d - debt weight

 w_e - equity weight

 C_d - cost of debt

 C_e - cost of equity

WACC is therefore the sum of cost of each component of company's capital (short and long term debt and/or equity), weighted by its proportion in the capital structure of the enterprise. Debt and equity weights (w_d) are respectively debt and equity's shares in company's total financing, where total financing is the sum of debt and equity committed. The cost of debt C_d accounts firm's tax benefits, i.e.

$$C_d = i_d(1 - T)$$

where i_d represents debt's interest rate and T is the rate of Corporate Income Tax. Firm's cost of equity (C_e) is the return rate that is expected by firm's shareholders. The cost of firm's equity can be calculated using the Capital Assets Pricing Model.

3.5.5 Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) was independently developed by Professors William Sharpe of Stanford University and John Lintner of Harvard University, relying on previous contributions to finance theory by Harry Markovitz. The model relates the required rate of return for a security to its risk as measured by beta.[10]

$$E(r) = r_f + \beta [r_m - r_f] \tag{3.11}$$

E(r) - expected return on asset in question

 r_f - return on risk-free asset

 β - asset's risk factor

 r_m - market return rate

The equation states, that the return on asset is equal to the risk-free return rate, augmented by a premium due to the risk of investing in stock of the particular firm, as depicted in figure 3.7.

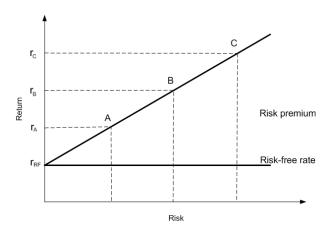


Figure 3.7: Risk - return relation [15]

The return (r_f) on risk-free asset is usually considered to be equal to the rate of return of short-term Treasury bonds, assuming that the default risk of the issuer and the risk of interest rate change are close to zero. These rates of return are quoted by national banks as their interest rates.

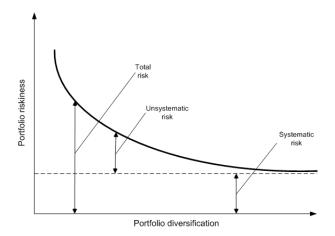


Figure 3.8: Unsystematic and systematic risks with respect to portfolio diversification[15]

The market return rate (m_f) is an expected return rate of a portfolio consisting of all stocks of the particular market. In other words, it is the return rate of the entire market, in which the firm operates. The calculation of market return rate is based on the analysis of price changes of stocks quoted on the market. It is known as the stock exchange index. The most famous indexes are:

- U.S. Dow Jones Industrial Average (DJIA),
- U.S. Standard & Poor's 500 (S&P 500),
- U.S. NASDAQ,
- U.K. Financial Times Stock Exchange (FTSE),
- German Deutsche Aktienindex (DAX).

The difference between market return rate and risk-free rate constitutes market's risk premium. The market risk premium depends on industrial and political stability in the country in question, as well as the number and strength of public companies quoted on the market. Risk premiums for different markets are presented in table 3.6.

Asset's risk premium (β) , also known as stock's volatility factor, is a function of stock's unsystematic risks. It describes stock's volatility with respect to the market it is quoted on. Consequently, it is estimated as a regression function parameter of relation between asset's return rate and return rate of corresponding stock market according to formula 3.12.

Characteristic of capital market	Market risk premium
Emerging markets	7,5% - 8,5%
Asia, Central and Eastern Europe, South America	
Developed markets with large number of joint-stock companies	5,5% - 6,5%
$USA,\ Japan,\ UK$	
Developed markets with small number of joint-stock companies	3,5% - 4%
$Germany,\ Switzerland$	

Table 3.6: Average market risk premiums determined on the basis of many-year observation[15]

$$\beta_c = \frac{Cov(r_c, r_m)}{Var(r_m)}$$

$$\alpha_c = Avg(r_c) - \beta_c \times Avg(r_m)$$
(3.12)

$$\alpha_c = Avg(r_c) - \beta_c \times Avg(r_m) \tag{3.13}$$

Beta is therefore the gradient of linear regression of stock vs. market returns, as depicted in figure 3.9.

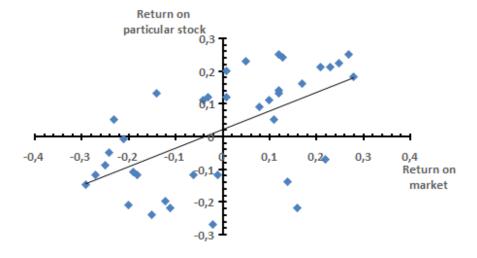


Figure 3.9: Linear regression, β estimation

3.6 EVA Conclusions

Economic Value Added, as a measure of performance in creating shareholders' value constitutes management's evaluation framework, consistent with the way in which capital markets assess joint-stock companies. In order to maximize investors assessment, management should undertake initiatives that maximize economic value added. Management compensation system based on EVA results should provide relevant incentives.

By charging for the use of capital, Economic Value Added focuses managements attention on proper utilization of firm's assets. Resources that are not transformed into finished goods, are kept in reserves, freezing capital invested and generating no returns. From economics perspective, the capital could be utilized in other way, in which it could earn return, therefore it accounts for a waste. By punishing this behavior, management receives an inventive to pay attention to proper forecasting of resource requirements, which leads to better utilization of assets.

Arithmetics of Economic Value Added suggests that management can strive to generate EVA in four ways.

3.6.1 Operational effectiveness

Operational effectiveness reveals management's efficiency in using company's assets. Having certain amount of capital available, management can allocate it in different ways, which can generate significantly different returns. The management can therefore seek for optimal capital allocation, which by increasing its operational effectiveness, results in higher returns on capital invested simultaneously generating higher Economic Value Added.

Management can seek for improvement product (or service), or process-wise. Product-wise improvement means changing firm's product line in a way that generates higher return. It may be achieved by reducing direct product production costs, simultaneously increasing its profit margin etc. Process-wise improvement deals with production process. Through process re-engineering and optimization, management can reduce resource consumption therefore augmenting its production capacity. Within the same capital committed, firm can produce more, generating more revenues thus increasing return rate on its capital

3.6.2 New investments

Expansion can increase firm's revenues. A company can expand its operations by entering new markets or industries. Before the activities start generating revenues they usually require new capital to be committed. For the investments to be successful, firm's Net Operating Profit After Tax improvement due to the initiative must be higher than the increase of capital cost due to increase of company's financing.

The management can analyze in advance investment's profitability by careful inspection of its cash flows. Setting the return requirement to firm's WACC, the management should invest in NPV-positive projects that is in projects whose Internal Rate of Return exceeds firm's Weighted-Average Cost of Capital.

3.6.3 Restructuring

Changing business environment, due to competitive market rivalry may cause initially EVA positive activities loose its profitability. Management should therefore monitor its profit margins and business opportunities that arise. Firms whose operations generate no, or negative EVA should be restructured.

Management should perform economic analysis of its restructuring targets. Withdrawing capital from unprofitable activities, should generate savings from the reduction of capital costs that are higher than the drop of NOPAT due to the abandonment. In other words, the company should eliminate activities and liquidate assets that do not generate earnings that exceed their cost of capital.

3.6.4 Optimal capital structure

Firm's financing strategy has great impact on its cost of capital and consequently on Economic Value Added generated from its operations. According to Modigliani and Miller, the existence of profit before tax, makes debt the cheapest way of financing, due to interest rate payments that reduce taxation basis. However, the optimal capital structure, which balances tax shield benefits with the risk of bankruptcy, depends on business nature of the firm. Company operating in well established market with stable and certain cash flows, may increase its financial leverage ratio (increase debt participation in capital structure) taking full advantage of the tax shield. In contrast, high-risk companies, not being certain about its future cash flows may not afford the risk of bankruptcy due to default of debt maintenance.

The management should therefore design firm's capital structure in a manner that suits business characteristic and market environment, simultaneously minimizing its Weighted-Average Cost of Capital.

Chapter 4

Optimization models

While some decisions are of strategic nature and so they cannot be simply the result of optimization, others in particular related to production and distribution can be easily modeled with mathematics and solved for optimality. Application of Operations Research enables maximization of operational effectiveness, which is one of the four leverages of EVA and consequently of firm's market value.

4.1 Decision environment

Global Management Challenge is a simulation, in which participating teams compete against one another through managing virtual production firms, which sell their products globally. Teams' strategies and tactics have to be expressed within a consistent format, that the simulator understands. Consequently, at every stage of the simulation participants have to make a defined set of decisions that describes their plan of action.

Decisions concern firm's overall operations, as a whole providing firm's holistic move. The decisions are taken in four functional areas, which are:

- Marketing,
- Production and Distribution,
- Human resources,
- Finance.

Figure 4.1 is a section of a report sheet, that is provided to participants as a summary of their decisions.

Quantities	of Product			Product 1	Product 2	Product 3
make and	ship to:	EU Agents		545 *		
(Not delivered	d in	Nafta Dist		413 *		
full if starred)	Internet Di	stributor	1114 *	634 *	459
Price	es (€):	EU		325	490	715
		Nafta		320	485	710
		Internet		310	480	695
Advertising	(€ '000)		Corporate Ima	agel D	irect Product Adv	ertising
	EU		10	7	6	7
	Nafta		10	7	6	7
	Internet		22	7	7	9
Assembly 1				120	170	325
Take up Pr				0	0	0
R & D Expe	enditure (€	(000)		30	30	35
Purchasing				Next Quarter	3-months hence	6-months hence
Raw N	laterials O	rdered ('00	0)	6	0	0
.tuw ii			1			-
				Total Number	Support	
				Wanted for	Payments	%
Agents and	d Distributo			Wanted for Next Quarter	Payments (€ '000)	Commission
	d Distributo EU Age	ents		Wanted for Next Quarter 1	Payments (€ '000) 5	Commission 10,0
	d Distributo EU Age Nafta D			Wanted for Next Quarter	Payments (€ '000)	Commission
Agents and	d Distributo EU Age Nafta D Internet	ents istributors Distributor	0	Wanted for Next Quarter 1 1 1 xxxxxx	Payments (€ '000) 5 5 12	Commission 10,0 10,0 9,0
	d Distributo EU Age Nafta D Internet	ents istributors Distributor to Buy	0 0	Wanted for Next Quarter 1 1 1 xxxxxx	Payments (€ '000) 5 5 12 r of Ports Operate	Commission 10,0 10,0 9,0
Agents and	d Distributo EU Age Nafta D Internet Machines Machines	ents istributors Distributor to Buy	0 0 25	Wanted for Next Quarter 1 1 1 xxxxxx	Payments (€ '000) 5 5 12	Commission 10,0 10,0 9,0
Agents and Production Maintenanc	d Distributo EU Age Nafta D Internet Machines Machines e Hours per	istributors Distributor to Buy to Sell Machine	0	Wanted for Next Quarter 1 1 1 xxxxxx	Payments (€ '000) 5 5 12 r of Ports Operate	Commission 10,0 10,0 9,0 ed 5 20
Agents and Production Maintenanc Assembly F	d Distributo EU Age Nafta D Internet Machines Machines e Hours per	istributors Distributor to Buy to Sell Machine	0 25 10,00	Wanted for Next Quarter 1 1 1 XXXXX Numbe Web-site Dev	Payments	Commission 10,0 10,0 9,0 ed 5 20 el 3
Agents and Production Maintenanc Assembly II	d Distributo EU Age Nafta D Internet Machines Machines e Hours per Hourly Wage Workers Hire	ents istributors Distributor to Buy to Sell Machine a Rate (€.c)	0 25 10,00	Wanted for Next Quarter 1 1 XXXXXX Number Web-site Dev	Payments	Commission 10,0 10,0 9,0 ed 5 20 el 3
Agents and Production Maintenanc Assembly I Assembly I Investment	d Distributo EU Age Nafta D Internet Machiness Hours per Hourly Wage Workers Hird ts (+/. € '000ent Budget	ents istributors Distributor is to Buy to Sell Machine e Rate (€.c) ed (+) / Fired (€ '000)	0 25 10,00 (-) 0 0 115	Wanted for Next Quarter 1 1 1 XXXXX Numbe Web-site Dev Assem	Payments (€ '000) 5 5 12 r of Ports Operate elopment (€ '000) Shift Lev	Commission 10.0 10.0 9.0 ed 5 20 el 3 ed 0 0
Agents and Production Maintenanc Assembly I Assembly I Investment	d Distributo EU Age Nafta D Internet Machiness Hours per Hourly Wage Workers Hird ts (+/. € '000ent Budget	ents istributors Distributor to Buy to Sell Machine a Rate (€.c) ed (+) / Fired	0 25 10,00 (-) 0 0 115	Wanted for Next Quarter 1 1 XXXXX Numbe Web-site Dev Assem	Payments (€ '000) 5 5 12 r of Ports Operate elopment (€ '000) Shift Level bly Workers Train m Loans (€ '000)	Commission 10,0 1

Figure 4.1: Quarterly management decisions

4.1.1 Marketing

The primary functional area is marketing. It is the fundamental decision area because firstly it is the ground for firm's corporate strategy, understood as a unique market position that provides the firm with competitive advantage over its rivals.[17] Secondly, marketing decisions impact all other functional areas, meaning that in order for the company to be successful, all departments have to cooperate in order to realize the strategy.

Strategy

The ultimate decision that the marketing has to take is establishing its strategy. It can adopt one of Generic Strategies[18], described by Michael Porter, namely

- cost leadership,
- differentiation,
- focus.

It can also define its own strategy, as "the essence of strategy is choosing to perform activities differently than rivals do".[17] In either case, "A company can outperform rivals only if it can establish a difference that it can preserve. It must deliver greater value to customers, or create comparable value at a lower cost, or do both. The arithmetic of superior profitability then follows: delivering greater value allows a company to charge higher average unit prices; greater efficiency results in lower average unit costs."[17]

Team's strategy is expressed with its quality, pricing and advertising policy. The three aspects have to be consistent: quality of product should be manifested by its price and supported by relevant advertising. The three dimensions define firm's position in the market.

Pricing

Firm's pricing strategy has to consider its impact on demand. One of the fundamental laws in microeconomics, the law of demand, states that the higher the price, the smaller the quantity demanded, ceteris paribus¹.[20]

¹Latin expression for everything else being equal

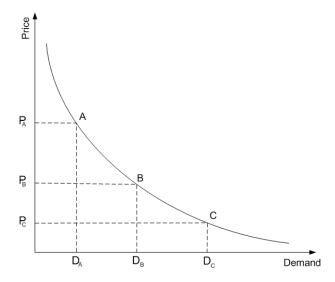


Figure 4.2: Demand curve

The price-demand relation is depicted in figure 4.2. One can draw the demand curve by careful inspecting how changes in price affect corresponding demand. Points A, B and C represent price and quantity demanded. By connecting the points, one can draw the demand curve. Shape of a demand curve is specific to every case. It depends on type of goods in question, the curve would look differently for everyday and premium or luxury products. It also depends on the market, e.g. region, or wealth of its target group. Furthermore, the price-demand relation is not constant over time. It might change due to product life cycle, competition activity or current macroeconomic outlook. When deciding on its pricing strategy, marketing should first gain deep insight into its market and then, after establishing its prices, constantly monitor the demand.

According to the law of demand, ceteris paribus, by decreasing price, the firm can increase the quantity of its products demanded. If the company is able to satisfy increased demand, it can in this way broaden its market share. However, theretofore it should make sure that the increase of company's revenues due to greater sales exceeds the drop of revenues due to decreased unit price. This concept, as a measure of responsiveness is known in microeconomics as the price elasticity of demand.[19]

$$E_d = \frac{\Delta Q}{\Delta P} \tag{4.1}$$

 ΔQ - percentage change in quantity demanded

 ΔP - percentage change in price

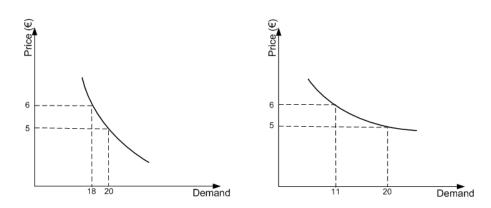


Figure 4.3: Price Elasticity of Demand

Figure 4.3 depicts two elasticity scenarios. In the example on the left, 20% change in price (5-6) causes demand to change by 10% (20-18). Using formula 4.1 $E_d = \frac{10\%}{20\%} = 0, 5$. In that case, demand is considered inelastic. The calculations repeated for the example on the right yields $E_d = \frac{45\%}{20\%} = 2, 25$, which means the demand is elastic.

The price elasticity of demand has tremendous effect on firm's total revenues with respect to price changes. In case of an inelastic demand there is a positive relation between price and total revenues: an increase of price increases total revenue and decrease of price decreases total revenue. On the contrary, in case of elastic demand price has negative relation with total revenue, meaning that an increase of price decreases total revenue and a decrease of price increases total revenue. This relationship is summarized in table 4.1.

Demand	Value of E_d	Price /	Price \
Inelastic	$E_d < 1$	TR /	TR 📐
Unitary elastic	$E_d = 1$	const	const
Elastic	$E_d > 1$	TR 📐	TR /

Table 4.1: Effects of price elasticity of demand on total revenues (TR)

Quality

Another aspect of the firm's corporate strategy is quality of company's products. In the Global Management Challenge, quality is regulated through assembly time skilled workers are supposed to spend assembling a single unit. Since the company produces three kinds of products, it needs to decide on the quality of each kind.

Marketing's product quality requirements are constrained by company's assembly workshop capacity which is the function of assembly workers employed. Since employment of skilled workers requires a quarter notice (with a probability of success), decisions about quality standards should consider number of skilled workers available, that has been reported in the management report. Consequently, increasing product quality, lengthens unit assembly time simultaneously decreasing number of products assembly workshop can produce within resources available. Furthermore increasing product quality increases unit production cost, which provided price remains unchanged, shrinks unit profit margin.

Product quality however has great effect on customer satisfaction. Good quality builds trust and loyalty toward corporate brand, on the contrary to poor quality, which in extrema cases makes customers feel cheated and eventually destroys it. Moreover quality is one of the main differentiating factors, which build firm's unique market position.

Research & Development

Together with quality innovation is the most differentiating factor of company's products. Innovative products, by definition, have no competition in the market, which when preserve, enables the firm to outperform its rivals.

Innovation is build through Research & Development activity, which should be a part of marketing strategy. Aligned with its strategy, marketing should decide on the level of support it is willing to spend on R&D activity of its product line.

Successful activities of R&D department result in improvement to company's products. In case of a major improvement, the decision to implement it needs to be made by the marketing. In that case, stock of old products are sold out for much lower price.

Advertising

One of the main ways of creating demand for firm's products is advertising. Advertising provides the company with means of communication with the market. It enables the company to announce

to the market the existence of its products or any improvement. The scale and reach of its efforts depend on the level of financial support marketing is willing to spend on advertising. Apart from direct advertising of its products, the firm should advertise its corporate image, which builds power of the brand.

Marketing has to decide on the level of support of direct advertising activities of an individual product in particular market. Furthermore, it needs to decide on its corporate image advertising spending for particular market.

Apart from creating demand, advertising supports product differentiation. It should be therefore an integral part of marketing strategy.

Agency

Besides advertising the agency system plays a vital role in creating demand for company's products. Right number of agents and distributors can provide appropriate coverage of the market which can significantly increase company sales.

Marketing has to decide on the number of agents in EU and distributors in NAFTA that it is willing to maintain in those markets.

Market awareness

An essential element of building a winning strategy and maintaining competitive advantage is information. Apart from constant analysis of business environment, marketing can order market research, that it has to pay for. There are two researches that marketing can order:

- Corporate activity report,
- Market share report.

The reports enable the firm to identify market opportunities and find its unique market position. They also serve as a benchmark for firm's operations.

4.1.2 Production

Production of goods is firm's primary operational area. It is firm's fundamental activity, which enables other activities to happen. It is the process of transforming raw material into finished products through a series of activities. Production planning and scheduling is essential for efficient utilization of firm's resources. In case of scarce resources such as constrained workshop capacity or raw material

limit, production plan needs to be restricted. Optimal allocation of scarce resources is a vital activity for maintaining operational effectiveness, which according to Michael Porter is an important part of firm's competitive advantage.

Short-term demand forecasts, prepared by marketing, are delivered to production department. The forecasts should be thoroughly analyzed and confronted with production capacity of production plant. As a result of the analysis, the department should decide about the level of shifts machinists are expected to work. However the planning should take under account the fact that introducing every consecutive shift increases average machinist wage by 33%.

It might be the case that demand forecast exceeds production capacity by a quantity, which does not generate enough revenue to cover the increase of production cost due to the introduction of the consecutive shift. In that case, production management has two options. It can limit the production to so that demand is satisfied within production capacity available with current level of shifts. In that case, one of the decision criterion used for prioritize production is products unit profit margin.

	Product A	Product B
Unit price	€ 200	€ 400
Unit production cost	€ 120	€ 280
Unit profit margin	€ 80	€ 120

Table 4.2: Profitability analysis example

Figure 4.2 depicts an example of two products comparison. The company sells product A for ≤ 200 and product B for ≤ 400 . Their respective unit production costs are ≤ 120 and ≤ 280 . Consequently, the products yield ≤ 80 and ≤ 120 of unit profit. According to the analysis, product B is more profitable.

The above analysis neglects resource consumption of production processes of the two above products. More precisely, let us assume that the products have common production process, which differ with time that is spend on assembling an individual product. Product A requires 50 minutes while product B requires 150 minutes. Let us further assume that the production line has the capacity of 100 000 minutes. In that case, the factory is capable of producing 2 000 units of product A and 666 units of product B. Applying unit profit margins from table 4.2 we conclude that monotonous production of product A yields \in 160 000 of profit, while monotonous production of product B generates only \in 80 000 profit. In that case, product A is more attractive.

	Product A	Product B
Resource requirement	50 units	150 units
Productivity	2 000 products	666 products
within 100 000 units available		
Total profit	€ 160 000	€ 80 000
using unit profit margins		
$from \ table \ 4.2$		

Table 4.3: Profitability analysis under production constraints

Compiling the two tables into one, we obtain:

	Product A	Product B
Unit profit margin	€ 80	€ 120
Resource requirement	50 units	150 units
Return on resource unit	€ 1,6	€ 0,8

Table 4.4: Return on resource unit

In other words, for every resource unit invested, product A generates ≤ 1.6 whereas, product B only ≤ 0.8 .

In the above example, in order to maximize firm's profit, the firm should satisfy demand for product A entirely, and use any resources left for production of product B. Obviously, the example is of the simplest form. In case of GMC, the management deals with three different products, being sold in three different markets, which due to different transportation and agency costs cause the products to have different profit margins. Consequently, from the profitability perspective the management deals with nine different products. Moreover, the production process is multi-stage, which makes the analysis even more complicated.

An alternative would be to adopt forward-looking production planning. The approach requires additionally one quarter ahead demand forecast, to be delivered by the marketing. In that case, provided that the demand exceeds current shift level capacity, the factory can switch on higher gear to satisfy the current demand and partially cover next quarter's demand, so that next quarter both the demand is fully satisfied and the production goes on lower pace. In other words, current production schedule would include the quarter after next demand by working in higher gear. This situation is depicted in figure 4.4

In the example presented in figure 4.4, the demand in quarter IV exceeds two shift production ca-

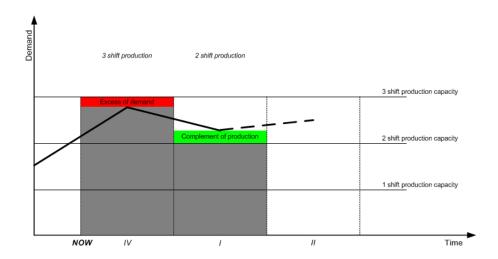


Figure 4.4: Optimal utilization of excess of demand

pacity. Three shift production however provides production capacity that is higher than the demand. Furthermore the increase of machinist wage rate due to introduction of additional shift applies to all machine operators, so any production capacity that is not utilized might be considered a waste. Addressing that, the three shift production capacity can be utilized fully, so that any stock of unsold products (i.e. excess of demand as depicted with red color) are used as a complement of two shift production in the quarter after next (i.e. complement of production as depicted with green color). Alternatively the excess of demand in quarter after next with respect to two shift production capacity can be incorporated into demand forecast, expected for the next quarter. In either case, the unsold products that are warehoused for the quarter after next are charged warehousing fee, which shrinks their profit margins.

In its search for optimal production, management can additionally manipulate its production capacity, which due to its nature, is a long-term action. Machine purchasing requires considerable financial outlays and takes two quarter to introduce changes, it provides however means to expand sales volume and/or decrease production costs. Production schedule engaging three-shift machining can be accomplished at two-shift pace with correctly increased number of machines. The decision about purchasing additional machines requires careful investigation. Purchasing of too many machines leads to resources not being utilized i.e. earning no interest and in fact loosing money due to opportunity cost. On the other hand purchasing of too few machines limits production capacity, causing the company not being able to satisfy demand for its products and moreover increases production costs.

In the above discussion there were examples of dilemma that management faces, while preparing

production schedules. The variety of production options, which impact products' profit margins and consequently firm's operating profit calls for application of optimization techniques.

Michael Porter defines operational effectiveness as performing activities better than rivals do.[17] Application of operations research for production planning and scheduling maximizes firm's profit. Measuring operational effectiveness with rate of return on firm's operations, optimization makes firm's operations most possibly effective.

Besides the schedule, production department needs to decide on the assembly time that is devoted on assembling an individual product. The decision relies on quality requirements set by marketing, as a consequence of its strategy. It might be the case that quality requirements make satisfying demand unattainable, since assembly time available is one of production constraint. In that case, production department should communicate the shortage to human resources department, which would take appropriate measures to provide necessary workforce.

Production department is also responsible for managing raw material supply. Future market transactions offer significant saving, they require however long-term demand forecasts, to relay on.



Figure 4.5: Price difference between spot, 3- and 6-month delivery

Figure 4.5 depicts advantage of future- over spot-market purchasing. The blue line represents raw material prices available in the spot market. The red and green lines recall future market prices available three and six months earlier respectively for three and six month future delivery. In this

way, considering third quarter of 2005, the spot price is \$ 37 008 (for 1000 units), as opposed to \$ 36 660 if it had been ordered in the second quarter of 2005 (one quarter earlier) and \$ 36 018 if it had been ordered in the first quarter of 2005 (two quarters earlier). In this way purchasing raw material in the future market with six months delivery generates saving of nearly \$ 1 000 per 1000 units, which accounts for lower directs production costs, increasing product profitability.

4.1.3 Human Resources

Human Resources department is responsible for providing adequate workforce to achieve production goals. While unskilled machine operators are employed implicitly according to the number of machines and level of shifts; hiring of skilled assembly workers requires explicit decision, takes one quarter (if successful worker is available in quarter after next) and its success depends on the labor market, e.e. unemployment rate, and conditions offered. It requires therefore sound familiarity of the market and appropriate planning.

Instead of hiring within the assembly workers' market, which carries the risk of failure, the firm can educate its own assembly workers from the pool of unskilled workers available in the labor market. Although it is a costly process, its provides certainty that the assembly worker will be available in the quarter after next. Shortage of assembly workers can limit firm's production capacity, simultaneously thwarding marketing's plans.

Work conditions offered by the company have strong influence on company's image as an employer in the labor market. Positive image eases hiring process, while negative hinders it. Through work conditions labor market understands:

- Wage rate,
- Workload.

Average wage rate in the company bases on assembly worker wage, that HR management sets quarterly. It should be high enough to keep employees satisfied and/or attract new hires, on the other hand, low enough to maintain products profitability at a reasonable level. The basic wage rate of machine operators equals 65% of assembly worker's, but increases by 33% with every consecutive shift level introduced.

Assembly employees work single shift only. In case of excessive demand, they may work on Saturdays and Sundays, being compensated with 50% and 100% extra of their basic rate. Continuing working on weekends negatively impacts firm's image and may be the reason for leaves.

Furthermore, human resources department should monitor long-term assembly workers demand, through long-term production goals. Since every dismissal and new hire incur costs and carry the risk of failure; in case of temporary drop in production it might be more cost efficient to keep them work at lower pace, than dismissing them at one point and then hiring them back again in another.

4.1.4 Finance

Another firm's functional area, finance, strives to maintain firm's financial prosperity.

One of the issue finance department is responsible for is providing firm's financing. A properly functioning business should be able to finance its day-to-day operations with revenue that they generate. The revenue should not only cover direct costs of producing goods, it should be high enough to cover company's fixed costs e.g. lease installment, management budget, R&D expenditures. That is why finance department should play an important role in deciding on product prices and profit margins.

As part of their strategy management may decide to expand its operations through entering new market, or significantly increasing its market share. Such activities usually require former expenditure, before they start generating revenue. The expenditure is considered an investment. When deciding on investment financing sources, the management can either:

- Use equity capital i.e. reserves or retained earnings,
- Use debt i.e. long- or short-term bank loans.

Firm's fundamental capital is shareholders' equity, that has been initially invested or raised by issuing stock at further stage of corporate development. Throughout the simulation, shareholders' equity remains unchanged, the management cannot either issue additional, or repurchase of existing stock. Consequently, management can control its capital structure and indirectly Weighted-Average Cost of Capital by incorporating debt to its financing sources.

When managing debt, management can decide between three alternatives, as summarized in table 4.5.

	Term loans	Flexible loans	Unsecured loans
Control	Direct	Indirect	Indirect
Type	Fixed	Variable	Variable
Interest	12%	$pprox 7\%^1$	$\approx 13\%^2$

Table 4.5: Debt financing options summary in Global Management Challenge

In Global Management Challenge, management has direct control only on a single debt source - term loans. Flexible and unsecured loans are taken automatically, according to firm's current financial conditions and capital requirements. In that sense, management has an indirect control of this kind of debt. A flexible loan is a bank account overdraft. Every quarter based on firm's financial condition the bank grants the firm an overdraft limit. The limit for the next quarter is quoted in last management report. In case firm cash requirement exceeds the limit, unsecured loans are taken automatically. In case management decides to use debt to finance its investment, it can decide to take a term-loan. The amount of capital that financial institutions are willing to commit is quoted every quarter in the management report. Generally, term loan is a long term investment, therefore it is not repaid throughout the simulation.

Petty cash i.e. cash that is accounted in firm's Balance Sheet, when not invested not only does not earn any interest, due to inflation it actually looses value over time. In case firm possesses much cash, management can decide to it invest it in liquid financial instruments that generate interest. If the firm needs cash, the instruments can be easily converted to cash.

Every quarter finance department needs to decide on management budget. Management compensation is an essential element of any value-based system. It serves as an incentive for managers to achieve certain managerial goals. The compensation system should therefore be bound to management performance, measured with clearly defined metrics, that are aligned with shareholder's goals. According to EVA practitioners, employees should be compensated according to wealth created from their activities. The simplicity of Economic Value Added enables and provides means to measure value created at any level of a business. Furthermore, EVA practitioners suggests that managers should participate in wealth created, in order to achieve the highest level of their commitment. Based on the above premises, the level of management budget, that needs to be decided every quarter, can serve as a compensation system. The level of support should then depend on value that has been created in former quarter.

¹EU Central Bank's base rate + 4%, assuming base rate of 3%

²EU Central Bank's base rate + 10%, assuming base rate of 3%

Risk attitude determines firm's willingness to take risk. According to this attitude, every quarter the management needs to make the decision about its insurance policy. It can either choose between four insurance plans, which vary in insurance excess and consequently insurance premium, or to take the highest risk of not taking any insurance and covering any losses by itself.

Profit generating joint-stock firm can decide to distribute part of its profits to its shareholders. Twice a year, the finance department needs to decide on the amount that is going to be given away as dividend. Earnings that are not distributed are retained and can be used for investments.

4.2 Modeling

Beneath, a number of optimization models are presented, serving for decision support in Global Management Challenge.

4.3 Single period profit maximization model

The purpose of this model is finding profit maximization configuration of products. The model is expected to control the level of shifts at which production is carried. The model should be fed with demand forecasts and product prices, as well as number of machines possessed by the firm and number of assembly workers employed.

4.3.1 Verbal model description

The model introduces a number of indexes: i - products, j - markets, l - level of shifts, h - week-wise work load. Then the model introduces a number of decision variables: x_{ij} defines number of units of products i, that is going to be produced and shipped to market j.

Demand

Production schedules must rely on demand forecasts delivered by marketing. The forecasts should contain precise estimates of demand for product i in market j. Having demand estimates, number of products produced and shipped to market must not exceed the forecasts. In other words, the following equation must hold:

$$x_{ij} \le D_{ij} \qquad \forall i, j$$

Machining

Production throughput of machine shop is restricted by two limitations. Firstly, machines have their production capacity for every shift: quarterly 588 hours for one and additional 504, and 546 for second and third shift, respectively. Secondly, labor union agreement allows certain quarterly workload limits for every shift. These are quarterly 588 hours for one shift, additional 546 hours for each of second and third shifts. These figures, introduced in tables 2.16 and 2.3, have been aggregated into table 4.6.

Shift	Machine production	Machinist workload
	capacity	limit
1 st shift	588	588
2 nd shift	504	546
3 rd shift	546	546

Table 4.6: Machine capacity and machinist workload limit, according to shift level

Joining the two constraints with week-wise workload limits of machine operators due to labor union agreements introduced in table 2.16, one obtains machining time limit (ψ_{lh}) along l and h dimensions, defined by table 4.7.

$l \setminus h$	Weekdays	Saturday	Sunday
		base \times 1,5	$base \times 2$
I	420	84	84
II	420	42	42
III	420	42	84

Table 4.7: Machining time limits, ψ_{lh}

Let variable m_{lh} represent machining hours that are used to realize production plan, expressed in terms of week-wise and shift-wise workload reflecting the structure presented in table 4.7. The machining hours constituting machining plan must not exceed corresponding maximum machining capacity available for the number of machines that the firm possesses. In other words, the following equation must hold:

$$m_{lh} \le \psi_{lh} M$$
 $\forall l, h$

Furthermore, the plan must reflect shift policy captured by binary variable w_l in the way that when it is set to 0, the plan has to be set to zero for the corresponding shift as well. In other words, the

following equation must hold:

$$\sum_{h} m_{lh} \le \text{BigM} w_l \qquad \forall l$$

Moreover, production plan (x_{ij}) when translated into machining hours (Ξ_i) and updated with machine efficiency (e), must not exceed machine-shop plan (m_{lh}) . The relation therefore serves as a binding between production plan x_{ij} and machining plan m_{lh} In other words, the following equation must hold:

$$\sum_{i} \sum_{j} x_{ij} \frac{\Xi_{i}}{e} \le \sum_{l} \sum_{h} m_{lh}$$

Shift	Premium
introduced	L_l
I	1
II	$0,\!33$
III	$0,\!33$

Table 4.8: Premium by which base wage rate is increased when introducing consecutive shifts

An essential aspect of firm's total machining cost is the hour rate machinists are paid. Initially (working single shift) it equals to 65% of assembly workers hour rate. When second shift is introduced, the hour rate increases by 33% and applies equally to all hours, no matter if used in first, or second shift. Similarly, when the third shift is introduced, the hour rate increases by extra 33% and applies to all subsequent shifts. Assuming w_l is a binary variable being set to 1 if corresponding shift is introduced and 0 if it is not and L_l defines rate premium for subsequent shifts as introduced in table 4.8, the machinist hour rate can be calculated according to the formula:

Hour rate =65%
$$\sum_{l} w_l L_l \Omega$$

Within machine-shop work plan m_{hl} , hours worked on Saturdays and Sundays are compensated by additional week-wise workload bonuses (H_h) , as shown in table 4.7. Every hour worked on Saturday and Sunday is compensated by additional 50% and 100% rate. They however do not affect the base rate. Since every machine is operated by four machinists, machining time required to realize scheduled production plan translates to machinists time, that the company pays for. The direct machining cost can be calculated according to the formula:

Direct machining cost =
$$\sum_{l} \sum_{h} m_{lh} H_h 65\% \sum_{l} w_l L_l \Omega$$

The above equation introduces nonlinearity to the formulation. Possible linearization solutions are discussed later in this chapter.

Additionally every shift requires proper supervision which imposes a cost (S) of $\leq 12~500$ per shift. The supervision cost can therefore be calculated by formula:

Cost of supervision =
$$\sum_{l} w_{l} S$$

Bringing it all together, the constraints represented by equations 4.41 to 4.43 are incorporated to the model.

Assembling

Assembly workers are skilled workforce, who only work single shift. Apart from the regular 5-day work week, they can be told to work at Saturdays and Sundays. Working at weekends augments workshop capacity but requires additional compensation according to table 4.9.

h	Weekdays	Saturday	Sunday
Quarterly time available $\psi_{l=I,h}$	420	84	84
Week-wise workload bonuses H_h	$base \times 1$	base \times 1,5	base $\times 2$

Table 4.9: Assembly workers parameters

Analogically to machining, firm's assembly-shop also requires planning. The production plan x_{ij} expressed in terms of finished products must be translated into assembling hours and confronted with shop's capacity.

Let a_h denote assembly shop work plan, expressed in terms of assembling hours that are utilized along the h dimensions, that is let a_{Weekdays} represent quarterly hours of all assembly workers, planned to be utilized within weekdays, whereas a_{Saturday} and a_{Sunday} represent analogical hours on weekends. Then the plan must not exceed the maximum capacity $(\psi_{l=1,h})$ available for all assembly workers (A) employed by the firm. In other words the following equation must hold:

$$a_h \le \psi_{lh} A$$
 $\forall h, l = I$

Furthermore, production plan x_{ij} when translated into assembly hours (λ_i) , must be feasible with respect to assembly-shop work plan a_h . In other words, the following equation must hold:

$$\sum_{i} \sum_{j} x_{ij} \lambda_{i} \le \sum_{h} a_{h} \tag{4.2}$$

Assembly workers are paid per hour at fixed hourly rate Ω . Hours worked on Weekends are compensated by extra 50% and 100% premiums for Saturdays and Sundays respectively. Firm's assembly cost is therefore calculated according to the formula:

$$\sum_{h} a_h H_h \Omega \tag{4.3}$$

Bringing it all together the above equations are incorporated to the model.

Raw material

All three products are made of the same raw material, though they vary in its content. Raw material content per product is presented in table 4.10.

	Product 1	Product 2	Product 3
Raw material content	1	2	4

Table 4.10: Raw material content per product R_i

Raw material is ordered and delivered in parcels of 1 000 units. Excessive unused raw material imposes additional storage costs, secondly it stalls cash flows. Addressing the decision problem an integer variable r is introduced, which represents number of parcels that are needed. Then production plan x_{ij} translated into raw material units (R_i) , must not exceed raw material that is available from ordering r number of raw material parcels. In other words, the following equation must hold:

$$\sum_{i} \sum_{j} x_{ij} R_i \le r\theta$$

Raw material cost is the consequence of parcels ordered that is, the number of parcels (r) charged with current raw material price χ . It is therefore calculated with the following formula:

Raw material cost =
$$r\chi$$

The above equations are incorporated to the model.

Transportation

Finished products are shipped to their destination markets in transportation containers of fixed size of 500 units. The products differ in sizes, according to table 4.11.

	Product 1	Product 2	Product 3
Standardized product size in units V_i	1	2	4

Table 4.11: Product sizes

Let integer variable c_j represent a number of containers that are to be shipped to market j. Then for every market the sum of products that are to be shipped to that market, multiplied by their volume, must not exceed total container capacity available for the market $(c_j U)$.

$$\sum_{i} x_{ij} V_i \le c_j U$$
 $\forall j$

The transportation costs differ between markets, however total transportation cost is the sum of transportation costs of every market. Assuming C_j defines transportation cost to market j, total transportation cost can be calculated with the following equation:

Transportation cost =
$$\sum_{j} c_j C_j$$

Objective function

Most generally, firm's operating profit is the difference between firm's revenue generated by its operations and the cost of those operations.

The firm generates revenue by selling its products in markets where it operates. The revenue can therefore be calculated with the following formula:

Revenue =
$$\sum_{i} \sum_{j} P_{ij} x_{ij}$$

In order to arrive at firm's operating profit, one needs to diminish its revenue by costs incurred by its operations. Besides machining, assembly and raw material and transportation costs, which have been described in preceding sections, there are additional variable costs that are directly proportional to

the magnitude of production having impact on the profitability of production.

One of such costs are agents' provisions. Agents and distributors are paid for selling company's products. As a motivating aid, they are given certain part of revenue they generate. The firm's quarterly sets the level of provision F_j that is paid to representatives in a given market. The provisions are therefore calculated using the following formula:

Provisions =
$$\sum_{i} \sum_{j} x_{ij} P_{ij} F_{j}$$

Another variable cost, proportional to the magnitude of production is the planning cost O, which is charged for every product produced. It is calculated using the following formula:

Planning cost =
$$\sum_{i} \sum_{j} x_{ij} O$$

4.3.2 Mathematical formulation

The data is:

• Sets (indexes)

i - Products \in {Product 1, Product 2, Product 3}

j - Markets $\in \{EU, NAFTA, Internet\}$

l - Shift $\in \{I, II, III\}$

h - Week pace \in {Weekday, Saturday, Sunday}

• Variables:

 x_{ij} - Amount of product i scheduled for production and shipment to market j

 m_{lh} - Quarterly machine-shop working plan

 a_h - Quarterly assembly-shop working plan

r - Integer variable representing number of raw material parcels needed

 c_i - Integer variable representing number of containers shipped to market j

 w_l - Binary variable being set to 1 if corresponding shift level is introduced

• Data:

 D_{ij} - Demand for product i in market j

- P_{ij} Price of product i in market j
 - au Assembly worker wage rate
- Ξ_i Machining time of product i in hours assuming 100% machine efficiency
- e Machine efficiency
- M Number of machines possessed by the company
- ψ_{lh} Maximum production capacity of a single machine per week and shift, according to table 4.7
- λ_i Assembly time of product i
- A Number of assembly workers employed by the company
- R_i Raw material content in product i
- θ Raw material units in a parcel = 1000
- V_i Volume of product i [1,2,4]
- U Container capacity = 500
- L_l Hourly rate increase per shift [1; 0,33; 0,33]
- H_h Hourly rate bonus for working on Weekends [1, 1,5, 2]
- Ω Assembly worker hour rate
- χ Raw material cost per 1000 unit parcel
- F_j Agents and distributor provisions [10%; 10%; 5%]
- O Planning cost
- C_i Container shipping cost
- S Cost of shift supervision of \in 12 500

The model is:

maximize:

$$\sum_{i} \sum_{j} P_{ij} x_{ij} \tag{4.4}$$

$$- 4\sum_{h}\sum_{l}m_{lh}H_{h}\sum_{l}w_{l}L_{l}65\%\Omega - \sum_{l}w_{l}S$$
 (4.5)

$$-\sum_{h} a_{h} H_{h} \Omega \tag{4.6}$$

$$-r\chi$$
 (4.7)

$$- r\chi$$

$$- \sum_{i} \sum_{j} x_{ij} P_{ij} F_{j}$$

$$(4.7)$$

$$(4.8)$$

$$-\sum_{i}\sum_{j}x_{ij}O\tag{4.9}$$

$$-\sum_{j} c_{j} C_{j} \tag{4.10}$$

subject to:

$$x_{ij} \le D_{ij} \qquad \forall i, j \tag{4.11}$$

$$\sum_{i} \sum_{j} x_{ij} \frac{\Xi_i}{e} \le \sum_{l} \sum_{h} m_{lh} \tag{4.12}$$

$$m_{lh} \le \psi_{lh} M \qquad \qquad \forall l, h \tag{4.13}$$

$$\sum_{h} m_{lh} \le \text{Big-M} w_l \qquad \forall l \tag{4.14}$$

$$\sum_{i} \sum_{j} x_{ij} \lambda_i \le \sum_{h} a_h \tag{4.15}$$

$$a_h \le \psi_{lh} A$$
 $\forall h, l = I$ (4.16)

$$\sum_{i} \sum_{j} x_{ij} R_i \le r\theta \tag{4.17}$$

$$\sum_{i} x_{ij} V_i \le c_j U \qquad \forall j \tag{4.18}$$

$$x_{ij} \ge 0$$
 $\forall i, j$

$$m_{lh} \ge 0$$
 $\forall l, h$

$$a_h \ge 0$$
 $\forall h$

(4.19)

4.3.3 Model findings

The model determines optimal production configuration that maximizes profit. The model suggest satisfying demand for product 3 in the first place, then the second and finally the first. A number of runs of the model with different input parameters showed, that within the simulation environment introducing third shift if unprofitable. In most cases it is more profitable not to satisfy demand for low-margin products (product 1) while keeping the shift level at the level of 2, than to introduce the third shift to satisfy that demand. That also refers to working at weekend. The model rarely utilized weekend capacity, rather leaving the demand unsatisfied.

Running the model with artificial cases, has shown that in case of large demand for high-margin products the third shift might actually be worthwhile. In that case profits from sales due to capacity increase must exceed losses due to the raise of machinist hour rate.

4.4 Two-period profit maximization model

The model addresses the decision problem of excessive production. Namely, it might be worth to produce more in one period for the sake of producing less in the following, preserving the excess of products in external storage.

The model relies on the single-period formulation, extending it to span over two decision periods. Relevant adjustments are incorporated to the model.

4.4.1 Verbal model description

Model assumptions and definitions

Figure 4.6 depicts tournament time-line. Decisions are always made in between quarters. The model runs in time D_1 , looking two quarters ahead. The goal is to maximize two-quarter profit.

With respect to the single-period, the two period model introduces a new index - q representing quarters Q_1 and Q_2 . Furthermore, the model introduces new variables: s_{ijq} representing sale of product i in market j in quarter q, and variable t_{ijq} , representing stock of product i in market j in quarter q. Variable x_{ijq} in the model represents production only i.e. these are products produced and shipped to its destination, but not necessarily sold in the quarter. Other variables from preceding model are adjusted to span over the quarters.

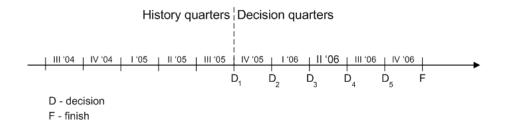


Figure 4.6: GMC competition time line

Balance equation

The inflows and outflows of particular products in given market for certain quarter are depicted in figure 5.9.

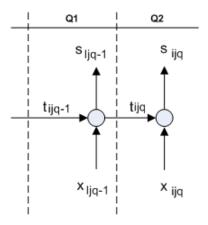


Figure 4.7: Balance relation

Products sold in quarter Q_2 must not exceed the number produced in that quarter augmented by any unsold products from quarter Q_1 . In other words, the following equation must hold:

$$t_{ijq-1} + x_{ijq-q} = s_{ijq-1} + t_{ijq} \qquad \forall i, j, q$$

The model can be fed with any stock of unsold products from previous quarter, so that they can be sold in quarter Q_1 . Since the model is two-period, the stocks at period Q_2 must be empty. The firm is charged for any unsold products a storage fee, according to table 2.8.

4.4.2 Mathematical formulation

The data is:

```
• Sets (indexes)
```

```
i - Products \in {Product 1, Product 2, Product 3}
```

```
j - Markets \in \{EU, NAFTA, Internet\}
```

```
l - Shift \in \{I, II, III\}
```

h - Week-wise work \in {Weekday, Saturday, Sunday}

```
q - Quarters \in \{Q_1, Q_2\}
```

• Variables:

```
s_{ijq} - Number of product i sold in market j in quarter q
```

 t_{ijq} - Number of product i unsold in market j in quarter q

 x_{ijq} - Amount of product i scheduled for production and shipment to market j in quarter q

 m_{lhq} - Quarterly machine-shop working plan in quarter q

 a_{hq} - Quarterly assembly-shop working plan in quarter q

 r_q - Integer variable representing number of raw material parcels needed in quarter q

 c_{iq} - Integer variable representing number of containers shipped to market j in quarter q

 w_{lq} - Binary variable being set to 1 if corresponding shift level is introduced in quarter q

• Data:

```
D_{ijq} - Demand for product i in market j in quarter q
```

 P_{ijq} - Price of product i in market j in quarter q

 T_i - Unit storage cost in market j

au - Assembly worker wage rate

 Ξ_i - Machining time of product i in hours assuming 100% machine efficiency

e - Machine efficiency

 M_q - Number of machines possessed by the company in quarter q

 ψ_{lh} - Maximum production capacity of a single machine per week and shift, according to table 4.7

 λ_i - Assembly time of product i

 A_q - Number of assembly workers employed by the company in quarter q

 R_i - Raw material content in product i

 θ - Raw material units in a parcel = 1000

 V_i - Volume of product i [1,2,4]

U - Container capacity = 500

 L_l - Hourly rate increase per shift [1; 0,33; 0,33]

 H_h - Hourly rate bonus for working on Weekends [1, 1,5, 2]

 Ω - Assembly worker hour rate

 χ - Raw material cost per 1000 unit parcel

 F_j - Agents and distributor provisions [10%; 10%; 5%]

O - Planning cost

 C_i - Container shipping cost

S - Cost of shift supervision of \in 12 500

The model is:

maximize:

$$\sum_{q} \left(\sum_{i} \sum_{j} P_{ijq} s_{ijq} \right)$$

$$- \sum_{i} \sum_{j} t_{ijq} T_{j}$$

$$- 4 \sum_{h} \sum_{l} \sum_{j} m_{lhq} H_{h} \sum_{l} w_{lq} L_{l} 65\%\Omega - \sum_{l} w_{lq} S$$

$$- \sum_{h} a_{hq} H_{h} \Omega$$

$$- r_{q} \chi$$

$$- \sum_{i} \sum_{j} x_{ijq} P_{ijq} F_{j}$$

$$- \sum_{i} \sum_{j} x_{ijq} O$$

$$- \sum_{j} c_{jq} C_{j}$$

$$(4.20)$$

subject to:

$$s_{ijq} \leq D_{ijq} \qquad \forall i, j, q \qquad (4.21)$$

$$t_{ijq-1} + x_{ijq-q} = s_{ijq-1} + t_{ijq} \qquad \forall i, j, q \qquad (4.22)$$

$$\sum_{i} \sum_{j} x_{ijq} \frac{\Xi_{i}}{e} \leq \sum_{l} \sum_{h} m_{lhq} \qquad \forall q \qquad (4.23)$$

$$m_{lhq} \leq \psi_{lh} M_{q} \qquad \forall l, h, q \qquad (4.24)$$

$$\sum_{h} m_{lhq} \leq \text{Big-M} w_{lq} \qquad \forall l, q \qquad (4.25)$$

$$\sum_{i} \sum_{j} x_{ijq} \lambda_{i} \leq \sum_{h} a_{hq} \qquad \forall q \qquad (4.26)$$

$$a_{hq} \leq \psi_{lh} A_{q} \qquad \forall h, q, l = I \qquad (4.27)$$

$$\sum_{i} \sum_{j} x_{ijq} R_{i} \leq r_{q} \theta \qquad \forall q \qquad (4.28)$$

$$\sum_{i} x_{ijq} V_{i} \leq c_{jq} U \qquad \forall j, q \qquad (4.29)$$

$$x_{ijq} \geq 0 \qquad \forall i, j, q$$

$$s_{ijq} \geq 0 \qquad \forall i, j, q$$

$$t_{ijq} \geq 0 \qquad \forall i, j, q$$

$$t_{ijq} \geq 0 \qquad \forall l, h, q$$

$$a_{hq} \geq 0 \qquad \forall l, h, q$$

$$a_{hq} \geq 0 \qquad \forall h, q$$

4.4.3 Model findings

The model purpose was profit maximization over two period horizon. It introduced the possibility to preserve unsold products in external storage in order to sell them in the following quarter. Storage however imposed additional costs.

The model suggests that it might be worth to produce more in the first quarter for the sake of producing less in the following. An optimal solution was found, which utilized full two-shift capacity of the first quarter in order to work single-shift in the second, preserving a supply of high-margin products (product 3) in external storage. The supply of high-margin product for the account of next quarter demand has been made at the expense of the demand for low-margin products not being satisfied. In a sense, high-margin products of the second quarter additionally charged with the storage fees successfully competed against low-margin products of the first quarter.

4.5 Relaxed Linear Programming model

In section 4.3 a single-period nonlinear mixed integer model has been introduced. Although for a simple problems a nonlinear formulation might find global optimal solution, it still lacks the important sensitivity analysis, that a linear program provides.

4.5.1 Bypassing nonlinearity

The model is nonlinear since calculation of total machining cost requires a product of two variables: machining work-load and machinist hour rate. Namely:

Direct machining cost =
$$\sum_{l} \sum_{h} m_{lh} H_h 65\% \sum_{l} w_l L_l \Omega$$

The hourly machinist rate is a function of number of shifts introduced. Simultaneously, increasing shift level augments machine-shop capacity. The level of shifts is controlled by three binary variables l_1 , l_2 , l_3 being set to 1 if introduced and 0 if not. Since the machining-shop requires at least single shift to operate the decision reduces to two variables, namely, whether or not to introduce the second and third shift. In either case, since there are only three modes in which machine-shop can operate, one can bypass nonlinearity by changing the binary variable w_l into a parameter and performing simple scenario/ what-if analysis. Since in every scenario, the number of shifts is predetermined, then so is the machinist hour rate. The nonlinearity is therefore bypassed.

4.5.2 LP relaxation

Even though the model is linear, it still has integer variables which requires a heuristic solver, preventing sensitivity analysis. The integer variables are: r representing number of raw material parcels of 1000 units to order and c_j , which represents number of containers shipped to market j. Redefining the variables to be real numbers, relaxes the model making it linear. Simultaneously, the model preserves transportation and raw material costs, which have influence on products' margins.

An LP model enables sensitivity analysis, which reveals important information about product profitability. Shadow prices of demand constraints, reveal marginal profitability of firm's products. Furthermore dual value of a variable with an optimal value of zero carry number by which the cost of producing a corresponding product would have to decrease for it to be relatively profitable. It is referred as a reduced cost and can serve as an indicator of a product being underpriced.

4.5.3 Mathematical formulation

The data is:

```
• Sets (indexes) i \text{ - Products} \in \{\text{Product 1, Product 2, Product 3}\}
```

```
j - Markets \in \{EU, NAFTA, Internet\}
```

```
l - Shift \in \{I, II, III\}
```

h - Week work load \in {Weekday, Saturday, Sunday}

• Variables:

```
x_{ij} - Amount of product i scheduled for production and shipment to market j
```

 m_{lh} - Quarterly machine-shop working plan

 a_h - Quarterly assembly-shop working plan

r - number of raw material parcels needed

 c_i - number of containers shipped to market j

• Data:

```
w_l - Shift level, 1 if introduced, 0 if not
```

 D_{ij} - Demand for product i in market j

 P_{ij} - Price of product i in market j

au - Assembly worker wage rate

 Ξ_i - Machining time of product i in hours assuming 100% machine efficiency

e - Machine efficiency

M - Number of machines possessed by the company

 ψ_{lh} - Maximum production capacity of a single machine per week and shift, according to table 4.7

 λ_i - Assembly time of product i

A - Number of assembly workers employed by the company

 R_i - Raw material content in product i

 θ - Raw material units in a parcel = 1000

 V_i - Volume of product i [1,2,4]

4.5 Relaxed Linear Programming model

U - Container capacity = 500

 L_l - Hourly rate increase per shift [1; 0,33; 0,33]

 \mathcal{H}_h - Hourly rate bonus for working on Weekends [1; 1,5; 2]

 Ω - Assembly worker hour rate

 χ - Raw material cost per 1000 unit parcel

 F_j - Agents and distributor provisions [10%; 10%; 5%]

O - Planning cost

 C_j - Container shipping cost

S - Cost of shift supervision of \in 12 500

The model is:

maximize:

$$\sum_{i} \sum_{j} P_{ij} x_{ij}$$

$$- 4 \sum_{h} \sum_{l} m_{lh} H_{h} \sum_{l} w_{l} L_{l} 65\%\Omega - \sum_{l} w_{l} S$$

$$- \sum_{h} a_{h} H_{h} \Omega$$

$$- r\chi$$

$$- \sum_{i} \sum_{j} x_{ij} P_{ij} F_{j}$$

$$- \sum_{i} \sum_{j} x_{ij} O$$

$$- \sum_{j} c_{j} C_{j}$$

$$(4.30)$$

subject to:

$$x_{ij} \le D_{ij} \qquad \forall i, j \tag{4.31}$$

$$\sum_{i} \sum_{j} x_{ij} \frac{\Xi_i}{e} \le \sum_{l} \sum_{h} m_{lh} \tag{4.32}$$

$$m_{lh} \le \psi_{lh} M \tag{4.33}$$

$$\sum_{h} m_{lh} \le \text{Big-M} w_l \qquad \forall l \tag{4.34}$$

$$\sum_{i} \sum_{j} x_{ij} \lambda_i \le \sum_{h} a_h \tag{4.35}$$

$$a_h \le \psi_{lh} A$$
 $\forall h, l = I$ (4.36)

$$a_{h} \leq \psi_{lh} A \qquad \forall h, l = I \qquad (4.36)$$

$$\sum_{i} \sum_{j} x_{ij} R_{i} \leq r\theta \qquad (4.37)$$

$$\sum_{i} x_{ij} V_i \le c_j U \tag{4.38}$$

$$x_{ij} \ge 0$$
 $\forall i, j$

$$m_{lh} \ge 0$$
 $\forall l, h$

$$a_h \ge 0$$
 $\forall h$

4.5.4 Model findings

Unlike the previous models, the linear programming model enables sensitivity analysis of the solution. Analyzing shadow prices of the demand constraints reveals marginal product profits. Furthermore in case of variables that have been set to zero in optimal solution, reduced costs analysis suggests how their prices should be updated in order to become relatively profitable.

4.6 EVA maximization model

So far, the models did not interfere capital structure. Their purpose was pure profits maximization within fixed capital. The concept of economic value added introduces capital charge, which, besides profit influences EVA.

In chapter 3 the concept of Economic Value Added was introduced. A firm generates economic value added if its operating income exceeds its capital charge, according to the following formula:

 $EVA = Net Operating Profit After Tax - Invested capital \times WACC$

While net operating profit after tax measures firm's profit, firm's capital charge is the value that firm's capital provides expect to receive for committing their capital. It is calculated as the product of firm's invested capital and its weighted average cost of capital, according to the above formula.

4.6.1 Modeling firm's capital charge

The firm can influence its capital charge by controlling the amount of capital expecting certain return (invested capital) and changing the cost of its capital by restructuring its financing. Since change of the amount invested usually induces changes to the structure of the capital and vice versa, the decision problem is of nonlinear nature.

In Global Management Challenge the control over firm's capital structure is somewhat limited. The firm cannot issue or repurchase stock, or return long-term debt. It can on the other hand manage its reserves and take a long-term loan.

Let Γ represent firm's equity capital, whereas Δ represent firm's debt. Moreover let μ and ν represent equity and debt financing respectively. Let ρ denote invested capital. Firm's invested capital ρ is therefore the sum of it's equity capital Γ , its current debt Δ and its new debt ν , according to the formula:

$$\rho = \Gamma + \Delta + \nu$$

Let y be an integer variable representing number of new machines that the company should purchase. Let ι denote price of a new machine and let ϵ denote firm's borrowing power. Let η represent firm's reserves. Since the firm can finance new machines either with its reserves or with new debt, the cost of new investment must be covered with either of the two, according to the formula.

$$y\iota = \mu + \nu$$

Financing by equity μ cannot exceed firm's current reserves η whereas financing with debt ν cannot exceed firm's borrowing power ϵ . In other words the following equations must hold:

$$\mu \leq \eta$$

$$\nu \le \epsilon$$

Let γ represent interest rate on firm's equity, calculated with Capital Asset Pricing Model and δ represent interest rate on long term debt. Let ω represent firm's weighted average cost of capital and let κ represent corporate income tax. Since reserves constitute firm's equity capital their utilization

does not change firm's WACC, as opposed to new long-term debt. Firm's weighted average cost of capital can be calculated with the following formula:

$$\omega = \frac{\Gamma}{\rho}\gamma + \frac{\Delta + \nu}{\rho}\delta(1 - \kappa)$$

The capital charge can therefore be calculated with the following formula

capital charge =
$$\omega \rho$$

Incorporating the cost of financing to the objective function, one obtains a model maximizing economic value added.

4.6.2 Mathematical formulation

The data is:

- Sets (indexes)
 - i Products \in {Product 1, Product 2, Product 3}
 - j Markets $\in \{EU, NAFTA, Internet\}$
 - l Shift $\in \{I, II, III\}$
 - h Week pace \in {Weekday, Saturday, Sunday}
- Variables:
 - x_{ij} Amount of product i scheduled for production and shipment to market j
 - m_{lh} Quarterly machine-shop working plan
 - a_h Quarterly assembly-shop working plan
 - r Integer variable representing number of raw material parcels needed
 - c_i Integer variable representing number of containers shipped to market j
 - w_l Binary variable being set to 1 if corresponding shift level is introduced
 - y Integer variable representing number of machines that should be bought
 - μ Equity capital financing
 - ν Debt financing
 - ω Weighted average cost of capital
 - ρ Invested capital

• Data:

- D_{ij} Demand for product i in market j
- P_{ij} Price of product i in market j
 - au Assembly worker wage rate
- Ξ_i Machining time of product i in hours assuming 100% machine efficiency
- e Machine efficiency
- M Number of machines possessed by the company
- ψ_{lh} Maximum production capacity of a single machine per week and shift, according to table 4.7
- λ_i Assembly time of product i
- A Number of assembly workers employed by the company
- R_i Raw material content in product i
- θ Raw material units in a parcel = 1000
- V_i Volume of product i [1,2,4]
- U Container capacity = 500
- L_l Hourly rate increase per shift [1; 0,33; 0,33]
- H_h Hourly rate bonus for working on Weekends [1, 1,5, 2]
- Ω Assembly worker hour rate
- χ Raw material cost per 1000 unit parcel
- F_j Agents and distributor provisions [10%; 10%; 5%]
- O Planning cost
- C_i Container shipping cost
- S Cost of shift supervision of \in 12 500
- Γ Firm's equity capital
- Δ Firm's debt capital
- γ Interest rate on firm's equity
- δ Interest rate on firm's long-term debt
- ι Price of new machine
- η Firm's reserves
- ϵ Firm's borrowing power

The model is:

maximize:

$$(\sum_{i} \sum_{j} P_{ij} x_{ij})$$

$$- 4 \sum_{h} \sum_{l} m_{lh} H_{h} \sum_{l} w_{l} L_{l} 65\%\Omega - \sum_{l} w_{l} S$$

$$- \sum_{h} a_{h} H_{h} \Omega$$

$$- r\chi$$

$$- \sum_{i} \sum_{j} x_{ij} P_{ij} F_{j}$$

$$- \sum_{i} \sum_{j} x_{ij} O$$

$$- \sum_{i} c_{j} C_{j} (1 - \kappa)$$

$$- \omega \rho$$

$$(4.39)$$

 $x_{ij} \leq D_{ij}$

subject to:

$$\sum_{i} \sum_{j} x_{ij} \frac{\Xi_{i}}{e} \leq \sum_{l} \sum_{h} m_{lh}$$

$$m_{lh} \leq \psi_{lh}(M+y) \qquad \forall l, h \qquad (4.42)$$

$$\sum_{l} m_{lh} \leq \text{Big-M}w_{l} \qquad \forall l \qquad (4.43)$$

$$\sum_{l} \sum_{j} x_{ij} \lambda_{i} \leq \sum_{h} a_{h} \qquad (4.44)$$

$$a_{h} \leq \psi_{lh} A \qquad \forall h, l = I \qquad (4.45)$$

$$\sum_{i} \sum_{j} x_{ij} R_{i} \leq r\theta \qquad (4.46)$$

$$\sum_{i} x_{ij} V_{i} \leq c_{j} U \qquad \forall j \qquad (4.47)$$

$$\rho = \Gamma + \Delta + \nu \qquad (4.48)$$

 $p = 1 + \Delta + \nu \tag{4.40}$

 $\forall i, j$

(4.40)

$$y\iota = \mu + \nu \tag{4.49}$$

$$\mu \le \eta \tag{4.50}$$

$$\nu \le \epsilon \tag{4.51}$$

$$\omega = \frac{\Gamma}{\rho}\gamma + \frac{\Delta + \nu}{\rho}\delta(1 - \kappa) \tag{4.52}$$

$$x_{ij} \ge 0$$
 $\forall i, j$

$$m_{lh} \ge 0$$
 $\forall l, h$

$$a_h \ge 0$$
 $\forall h$

4.6.3 Model findings

Apart from optimal production configuration, the model determines optimal number of machines, that should be purchased with respect to firm's current reserves and borrowing power. The model accounts implication of incorporating additional debt into firm's financing on firm's capital structure and finds optimal solution that maximizes the excess of firm's operating profit over firm's capital charge.

The model suggests increasing the number of machines consequently, first utilizing its reserves, then using its entire borrowing power. By increasing the share of debt in its capital structure, the model decreases firm's weighted average cost of capital. The model suggests to purchase new machines, as

the savings due to enlarged capacity exceed the increase of capital charge. In case of unbounded borrowing power, the model suggests increasing the number of machines to the level which enables single shift production.

4.7 Chapter conclusions

The models presented in the chapter help finding optimal production configuration for the expected demand and pricing.

The NLP models showed, that three shift working is unprofitable for most cases. They also suggested that excessive utilization of weekend capacity destroys value. They also solved the dilemma of satisfying demand with higher shift. Furthermore, linear programming models helped improve product pricing and overall profitability. They also suggested that enlarging the market for high-margin products should be firm's strategic priority. Finally, EVA maximization model suggested increasing the number of machines possessed by the company in order to lower machining costs.

Chapter 5

The game

The report covers the first round of the 2006 edition of Global Management Challenge taking place between May 23. and July 14. The author leads firm 2, of group 23.

5.1 Competition timeline

On the 24th of May all teams received 5 historical management reports, that documented firms' activity over the preceding five quarters (W011043 - W011053). The reports were identical between firms, so that the teams started from exactly the same business condition. After the teams took over the charge of the virtual companies, their decisions brought diversity to the game.

	Decision Sheets to be	Management Reports to be
	delivered to the Organizer	delivered to the Teams
1 decision cycle	05.06 till 4 p.m.	07.06 till noon
(23.05 - 05.06)		
2 decision cycle	14.06 till 4 p.m.	16.06 till noon
(07.06 - 14.06)		
3 decision cycle	23.06 till 4 p.m.	26.06 till noon
(16.06 - 23.06)		
4 decision cycle	03.07 till 4 p.m.	$05.07 \mathrm{\ till\ noon}$
(26.06 - 03.07)		
5 decision cycle	12.07 till 4 p.m.	14.07 till noon
(05.07 - 12.07)		

Table 5.1: Schedule of the 1st round of the 2006 edition of Global Management Challenge

After receiving historical reports, the teams were supposed to get familiar with their entities and as a result of their analysis create strategies for upcoming quarters. They were also supposed to prepare the first set of decisions, that were expected to be submitted until the June 5th. The decisions were then simulated against decisions of their rival teams. As a result of the simulation two days later a new management report (W232054) has been generated and delivered to the participants. The processes were reproduced four times throughout the following five weeks. The schedule is presented in table 5.1.

5.2 Historical data

Figure 5.1 quotes product prices set throughout the historical quarters. The prices remain unchanged throughout the period, which might suggest no pricing strategy available.

			W011043	W011044	W011051	W011052	W011053
		EU	275	275	275	275	275
	p1	NAFTA	275	270	270	270	270
88		Internet	270	270	270	270	270
prices		EU	440	440	440	440	440
	p2	NAFTA	440	435	435	435	435
roduct		Internet	435	435	435	435	435
Pro		EU	665	665	665	665	665
_	р3	NAFTA	665	660	660	660	660
		Internet	660	660	660	660	660

Figure 5.1: Product prices throughout the historical timespan

The demand for company's products is subject to strong annual seasonality, as depicted in figure 5.3. It is the lowest in the first quarter and the highest in the fourth, quarters second and third being somewhere in the middle. Comparing third quarter of '04 with a corresponding quarter of '05 reveals that the demand is rather constant on European market and on the Internet. The demand has a strong upward trend in NAFTA, as the demand in third quarter exceeds peak fourth quarter of the previous year.

When analyzing the increase of demand for company's products in NAFTA, one needs to be aware of the fact that its price, while set in Euros, is charged in US Dollars according to the exchange rate quoted in the last management report. The exchange rate is the price in Euros paid for one US Dollar. The exchange rates throughout 5 historical quarters are depicted in figure 5.4.

Figure 5.4 shows an increasing Euro-Dollar exchange rate, which indicates that the dollar has been

			W011043	W011044	W011051	W011052	W011053
		EU	776	860	727	773	777
	р1	NAFTA	627	718	648	710	756
<u>er</u>		Internet	1 380	1 477	1 311	1 390	1 374
orders	<u> </u>	EU	432	468	397	417	400
	p2	NAFTA	337	379	338	371	390
륟		Internet	773	808	706	740	712
2	Product b3	EU	236	262	219	231	221
_		NAFTA	182	204	183	199	206
		Internet	397	428	368	392	377

Figure 5.2: Table of product orders throughout the historical timespan

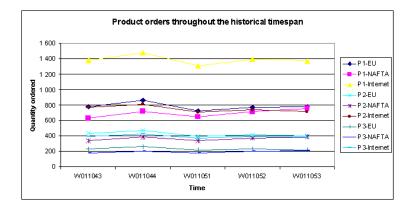


Figure 5.3: Graph of product orders throughout the historical timespan

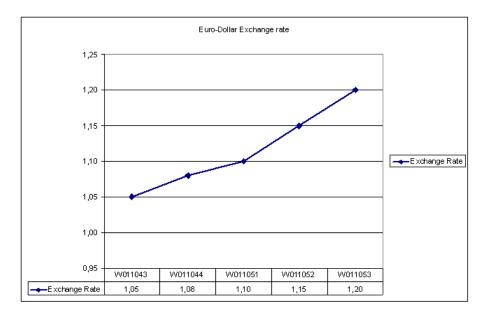


Figure 5.4: Exchange rate throughout the historical quarters

restrengthening. In case the Euro price is unchanged, increasing Euro-Dollar exchange rate decreases product's Dollar price.

The Euro-Dollar exchange rate has also a strong impact on the price of raw material. Since the price is quoted in Dollars, the money the firm needs to pay has to be updated with the exchange rate. Strengthening Dollar makes US goods more expensive. Within the 5 historical quarters, due to the exchange rate increase, the price of raw material has risen by nearly 20%.

Within the historical quarters, the company has not purchased any raw material at the future market. Assuming the increasing exchange rate trend remains constant, purchasing raw material for future delivery takes advantage both of lower price of future contracts as well as lower price due to expected exchange rate increase. The advantage is depicted on figure 5.5. If in quarter W011051 the company purchased 10 parcels of raw material at the future market for six months delivery, it would get the advantage of nearly \leqslant 50 000 over a company purchasing raw material for the same quarter at the spot market.

Since purchasing raw material on the future market requires immediate payment, it therefore freezes cash for six months. For this reason valuation technique should be applied to evaluate profitability of the cash commitment. One can use the Net Present Value introduced in chapter 3 according to

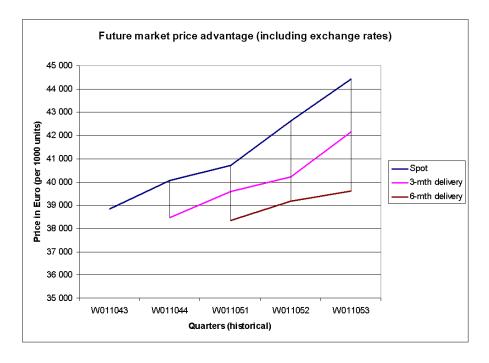


Figure 5.5: Future market and exchange rate price advantage

formula 3.4. We would analyze the Net Present Value of purchasing 10 parcels of raw material in quarter I of 2005 (report W011051) for six-month delivery with respect to its market value at spot market six months later. The initial investment would be the cost of purchasing 10 parcels of raw material for 6-month delivery for € 39 620, each. We would assume that the experiment would take one period of 6 months. The final payment would be the market value the 10 parcels according to current raw material price at the spot market equal 44 410 per parcel. Furthermore, assuming that the expected annual rate of return of an investment would be firm's weighted average cost of capital equal to 12%, 6-month investment would have expected rate of return equal to 6%. Feeding formula 3.4 one obtains

$$\frac{10 \times 44410}{(1+0.06)} - 10 \times 39620 = 22760$$

In other words, the Net Present Value of purchasing 10 parcels of raw material at in quarter I of 2005 for delivery in six months with respect to corresponding market value 6 month later, discounted at the rate of firm's cost of capital is equal to $\leq 22760!$ If the firm had purchased 10 parcels in the first quarter of 2005, it would achieve the advantage of ≤ 22760 over a company purchasing the same amount at the spot market six months later.

Another issue is product advertising. The advertising should communicate improvements introduced to firm's products and drive demand. Improvements should also be reflected by proper updates to product prices. Figure 5.6 presents advertising expenditures throughout historical period. The color indicates that in the given quarter there was no improvement to the product (color red), that there was a minor improvement (color yellow), or that there was a major improvement (color green). As one can observe, there was a major product 1 improvement in quarter 2 of 2005, it however was not communicated to customers by increased advertising spending. A implemented major improvement should also be reflected by an increased product price. Figure 5.1 reveals, there was no appropriate reaction.

			W011043	W011044	W011051	W011052	W011053
		EU	6	6	6	6	6
	p1	NAFTA	6	6	6	6	6
Вď		Internet	6	6	6	6	6
Si.		EU	6	6	6	6	6
Advertisi	p2	NAFTA	6	6	6	6	6
ş		Internet	6	6	6	6	6
∢		EU	6	6	6	6	6
	p3	NAFTA	6	6	6	6	6
		Internet	6	6	6	6	6

Figure 5.6: Advertising expenditures and product improvement throughout historical period

As part of the analysis, one should also analyze how did the company manage to satisfy demand for its products. Figure 5.7 depicts demand satisfaction throughout the historical period. The color indicates that the demand has been partially satisfied: color red - less than 80%, color yellow - between 80% and 90%, and color green - above 90%. As the figure reveals, the demand has been usually satisfied at the level lower than 90%, in 40% being lower than 80% reaching the level of 53% in the third quarter of 2005! These are extraordinary opportunity losses, that the company experienced.

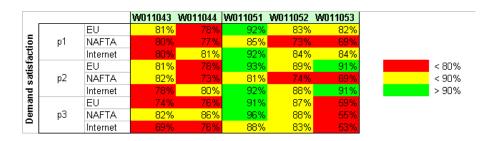


Figure 5.7: Demand satisfaction throughout historical period

Simultaneously one should consider production capacity that the firm has had. Figure 5.8 shows

capacity utilization throughout the historical period. Concluding from the labor union agreements time available for two shift working is distributed in the following way: 74% for weekdays, 11% for Saturday and 15% for Sunday. Utilization of these respective times is indicated with proper color. Throughout the whole historical period, the machinists were scheduled for working from Monday to Sunday, utilization reaching 95% of their time. Throughout the historical period the management decided not to introduce the third shift, which would signifficantly harm firm's profitability. Analogical analysis performed form the assembly shop indicates that it has been also over exploited with utilization reaching 96%.



Figure 5.8: Machine and assembly shop utilization throughout the historical period

Even though the company was not able to satisfy the demand for its products, while over exploiting its production capacity, throughout the historical period the management did not decide to purchase any new machines or hire new assembly workers. It can be considered an opportunity loss.

A fundamental aspect of Value-Based Management is the rate of return expected on firm's capital. Due to the different cost of debt and equity financing and their different share in firm's invested capital, the cost of capital is calculated as a weighted-average, according to formula 3.10 introduced in chapter 3.

To calculate the cost, one needs to determine the expected rate of return on firm's equity. The concept of Capital Asset Pricing Model has been introduced in chapter 3. Although the methodology of calculating the riskiness factor (β) has been introduced in chapter 3, due to fact that throughout historical period all companies have identical backgrounds, one is unable to perform a regression on the correlation of firm's stock with its market environment. This opportunity occurs after subsequent decisions. For the sake of simplicity let β be equal to 1 meaning that it faithfully follows market trends. Furthermore, the management reports carry no information about market risk. However due to the fact that the company is quoted in European stock exchange and has its operations in NAFTA and on the Internet, its market risk premium can be assumed to oscillate in the upper level of the Developed Markets risk premiums, according to table 3.6 at the level of 6,5%. Taking the average risk-free rate of European market, quoted in management reports of 3,3%, one obtains:

$$E(r_E) = 3.3\% + 1 \times 6.5\% = 9.8\%$$

Balance Sheet	W011043	W011044	W011051	W011052	W011053
Assets					
Value of Property	250000	250000	250000	250000	250000
Value of Machines	1777822	1733376	1690044	1647792	1606596
Total Fixed Assets	2027822	1983376	1940044	1897792	1856596
Value of Product Stock	0	0	0	0	0
Value of Raw Material Stock	59819	83947	107546	139169	200275
Debtors	716580	756984	762371	750754	675588
Cash	355225	474325	572821	635509	691734
Investments	0	0	0	0	0
Total Assets	3159446	3298632	3382782	3423224	3424193
0	0	0	0	0	0
Liabilities	0	0	0	0	0
Tax Assessed & Due	0	109302	109302	0	0
Creditors	344612	346931	354476	361440	366558
Bank Overdraft	0	0	0	0	0
Unsecured Loans	0	0	0	0	0
Total Current Liabilities	344612	456233	463778	361440	366558
Net Assets	2814834	2842399	2919004	3061784	3057635
Term Loans	601772	601772	601772	601772	601772
Net Worth	2213062	2240627	2317232	2460012	2455863
Share Capital	2000000	2000000	2000000	2000000	2000000
Reserves	213062	240627	317232	460012	455863
Shareholders Funds	2213062	2240627	2317232	2460012	2455863

Figure 5.9: Balance sheet throughout historical period

Using the information published quarterly in firm's balance sheet (figure 5.9), one can calculate firm's invested capital. Firm's equity capital can be arrived at, by summing firm's share capital, reserves, debtors, cash and investments, since it is the cash that firm's shareholders commit by not retrieving it through dividends. As an example, in the fourth quarter of 2004, firm's equity capital was:

$$\Gamma = 2000000 + 240627 + 756984 + 474325 + 0 = 2714952$$

In the same quarter, firm's debt financing consisted of long-term debt only, therefore:

$$\Delta = 601772$$

Adopting return on firm's equity equal to 9,8% and long-term debt interest rate equal to 12%, one can calculate the weighted average cost of capital in the following way:

WACC =
$$\frac{2714952}{3316724} \times 9,8\% + \frac{601772}{3316724} \times 12\% \times (1 - 30\%) = 9,4\%$$

In the journey toward Economic Value Added, one needs to establish the Net Operating Profit After Tax. Using the Profit & Loss statement, depicted in figure 5.10 and the Accounts statement, depicted in figure 5.11, one can arrive at NOPAT through the series of calculation steps.

Profit & Loss	W011043	W011044	W011051	W011052	W011053
Sales Revenue	1 549 280	1 692 885	1 695 085	1 671 390	1 489 895
Opening Stock Value	16 973	59 819	83 947	107 546	139 169
Materials Purchased	307 305	310 699			341 117
Assembly Wages	117 645	138 860	139 140	136 480	114 675
Machinists Wages	214 878	251 626	254 063	256 290	230 276
Machine Running Costs	95 234	99 898	100 239	99 825	97 140
Quality Control	8 000	8 000	8 000	8 000	8 000
Minus Closing Stock Value	59 819	83 947	107 546	139 169	200 275
Cost of Sales	700 216	784 955	798 525	794 563	730 102
Gross Profit/Loss	849 064	907 930	896 560	876 827	759 793
Insurance Receipts	0	0	0	31 294	39 189
Interest Received	0	0	0	0	0
Interest Paid	18 053	18 053	18 053	18 053	18 053
Overheads	686 959	708 564	698 570	705 036	683 882
Depreciation	45 586	44 446	43 332	42 252	41 196
Tax Assessed	0	109 302	0	0	0
Net Profit/Loss	98 466	27 565	136 605	142 780	55 851
Dividends Paid	60 000	0	60 000	0	60 000
Transferred to Reserves	38 466	27 565	76 605	142 780	-4 149

Figure 5.10: Profit&Loss statements throughout historical period

 $Tax = 30\% \times (Sales Revenue)$

- Cost of Sales
- Amortization
- Interest
- + Insurance
- Total Overheads)

Accounts (Euros)	W011043	W011044	W011051	W011052	W011053
Overheads					
Advertising	72 000	72 000	72 000	72 000	72 000
Internet Distrbution Agent	93 345	102 337	102 337	101 356	91 631
Internet Service Provider	28 185	29 637	29 637	29 369	26 717
Selling Agents & Distributors	111 867	120 027	110 385	112 545	106 972
Sales Office	19 730	21 427	18 669	19 900	19 758
Guarantee Servicing	19 410	19 240	20 190	23 020	21 020
Shipping & Hired Transport	54 750	55 400	55 400	55 400	52 150
Product Research	55 000	55 000	55 000	55 000	55 000
Web-Site Development	22 000	22 000	22 000	22 000	22 000
Personnel Department	7 000	7 000	7 000	7 000	7 000
Machine Maintenance	15 300	15 300	15 300	15 300	15 300
Warehousing & Purchasing	12 500	12 642	14 245	15 925	18 530
Business Intelligence	7 500	7 500	7 500	7 500	7 500
Credit Control	4 050	4 410	4 415	4 328	4 038
Insurance	12 268	12 525	12 403	12 285	12 221
Management Budget	120 000	120 000	120 000	120 000	120 000
Other Miscellaneous Costs	32 054	32 119	32 089	32 108	32 045
Total Overheads	686 959	708 564	698 570	705 036	683 882
Taxable Profit/Loss Accumula	ate 227 476	364 343	136 605	279 385	335 236
Insurance Claimed	1 694	0	840	33 341	41 225
Insurance Excess	2 044	2 087	2 067	2 047	2 036

Figure 5.11: Overheads statement throughout historical period

Applying the above formulas, one can arrive at firm's Economic Value Added. The calculation is presented in figure 5.12

Economic Value Added is then confronted with firm's stock price throughout the historical period. Plots of the data are depicted in figures 5.13 and 5.14.

As one can observe from the graphs, the firm is EVA positive, meaning that its profits exceed its capital charge. However in the light of falling demand satisfaction and over exploitation of its production capacity, switching to value destroying company seems just a matter of time. The stock market seems to share the same opinion since firm's stock price is falling. To address that Value-Based Management approach should be adopted.

Gross profit	849 064	907 930	896 560	876 827	759 793
Total Overheads	686 959	708 564	698 570	705 036	683 882
Operating Income	162 105	199 366	197 990	171 791	75 911
Tax	29 540	41 060	40 982	42 834	16 755
Amortization	45 586	44 446	43 332	42 252	41 196
Depreciation	0	0	0	0	0
Interest	-18 053	-18 053	-18 053	-18 053	-18 053
Insurance	0	0	0	31 294	39 189
NOPAT	160 098	184 699	182 288	184 450	121 488
Share capital	2 568 287	2 714 952	2 890 053	3 095 521	3 147 597
Interest on share capital	2%	2%	2%	2%	2%
Long-term debt	601 772	601 772	601 772	601 772	601 772
Interest on long-term debt	3%	3%	3%	3%	3%
Tax shield	30%	30%	30%	30%	30%
	_	_		_	
Overdraft	0	0	0	0	0
Interest rate	2%	2%	2%	2%	2%
Unsecured loans	0	0	0	0	0
Interest rate	3%	3%	3%	3%	3%
Invested capital	3 170 059	3 316 724	3 491 825	3 697 293	3 749 369
WACC	2%	2%	2%	2%	2%
Capital charge	74 918	78 475	82 721	87 704	88 966
EVA	85 180	106 224	99 567	96 746	32 521

Figure 5.12: Quarterly Economic Value Added Calculation

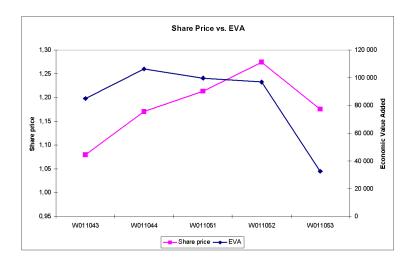


Figure 5.13: Share Price vs. Economic Value Added

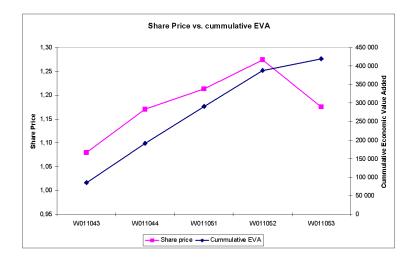


Figure 5.14: Share Price vs. Cumulative Economic Value Added

5.3 The winning decisions

To address shrinking Economic Value Added, models described in chapter 4 were applied. The initial tactics, were the consequences of the analysis described in preceding section.

The short-term strategy was to utilize quick-wins, as described in preceding section. Raw material was purchased at the spot market for upcoming quarter, but also at the future market both for three-month and six-month deliveries. In the future quarters, the company would only purchase raw material at the future-market with six-month delivery, with possible three months and spot market purchases in case of increased raw material demand.

Secondly, the shortage of production capacity was addressed with fundamental economical principle of price and demand. The demand for most profitable products was to be fully satisfied, sacrificing the demand for least profitable products. The remaining capacity was to be equally distributed among the least profitable products. Since the supply of company's least profitable products was expected to be seriously limited, the prices were decided to be radically increased in order to limit the demand.

The demand forecast for upcoming quarter, was the demand of a corresponding quarter last a year ago updated with the rate of change of the preceding quarter with respect to its seasonal equivalent,

a year earlier. It was calculated with the following formula:

$$D_n = \frac{D_{n-1}}{D_{n-5}} D_{n-4}$$

Figure 5.15 depicts calculated demand forecasts updated with orders backlog from preceding quarter.

			W011043	W011044	W011051	W011052	W011053	Forecast	Backlog	Plan
		EU	776	860	727	773	777	861	127	988
	p1	NAFTA	627	718	648	710	756	866	193	1 059
		Internet	1 380	1 477	1 311	1 390	1 374	1 471		1 471
2		EU	432	468	397	417	400	433	43	476
Demand	p2	NAFTA	337	379	338	371	390	439	101	540
ē		Internet	773	808	706	740	712	744		744
-		EU	236	262	219	231	221	245	61	306
	р3	NAFTA	182	204	183	199	206	231	55	286
		Internet	397	428	368	392	377	406		406

Figure 5.15: Demand forecast for fourth quarter of 2005 and orders backlog

Production plan accompanied by products' prices from preceding quarter were then fed to the Linear Programming model, described in section 4.5 of chapter 4. The model was set to faithfully reflect firm's production plant. Solving the model for optimality finds optimal solution that is depicted in figure 5.16.

Prices	P1	P2	P3
EU	275	440	665
NAFTA	270	435	660
Internet	270	435	660
Demand			
EU	988	476	306
NAFTA	1059	540	286
Internet	1471	744	406
Solution			
EU	988	476	306
NAFTA	0	540	0
Internet	1 086	744	406

Figure 5.16: LP solution

The solution translates to demand satisfaction and production pace depicted in figure ??.

In optimal solution products 1 and 3 intended for NAFTA market are set to zero, which indicates the products are least profitable. Sensitivity analysis presented in figure ?? confirms this finding.

The model was then adjusted so that the demand for company products in European Union and on the Internet would be fully satisfied. The production plan for NAFTA was reduced by 75%, while the

Demand satisfaction	P1	P2	P3
EU[100%	100%	100%
NAFTA	0%	100%	0%
Internet	74%	100%	100%
Machining '	₩eek	Sat	Sun
1	100,0%	100,0%	100,0%
II I	100,0%	100,0%	100,0%
III L	0,0%	0,0%	0,0%
Assembling 1	Week	Sat	Sun
	100%	100%	18%

Figure 5.17: Demand satisfaction and production pace

Reduced costs	P1	P2	P3
EU	0	0	0
NAFTA	13	0	29
NAFTA Internet	0	0	0
Shadow prices	P1	P2	P3
EU	7	53	39
NAFTA Internet	0	16	0
Internet	0	44	28

Figure 5.18: Sensitivity analysis of the LP solution

price has been increased by 30%. Solving the model for optimality improves the previous solution by $\in 10~000!$

Analogical analysis using NLP models was performed before all consecutive quarters, which streamlined firm's operational efficiency.

Shrinking Economic Value Added was also tackled with the EVA model described in section 4.6 of chapter 4. The model was designed to find optimal machine portfolio, through managing new machine investments taking under consideration its impact on firm's capital structure and EVA.

Again, the model was fed with current conditions including its borrowing power, WACC, interest rate on debt financing etc. Model findings are compiled in figure 5.19.

The model suggested purchasing 2 new machines, which although increased capital charge by \leq 15 000, still improved EVA by \leq 100 000! The finding was immediately implemented, although due to diminished borrowing power by cash necessary for covering future contracts on raw material, the purchased was spanned over two consecutive quarters.

Machines	6	6
New machine investment	-	2
Total machines	6	8
Revenue	1 832 694	2 070 198
Total Machining Cost	304 071	325 363
Total Assembly Cost	141 192	164 934
Raw Material Cost	370 780	417 128
Provisions	190 879	216 038
Planning cost	4 317	5 720
NAFTA Transportation cos	34 600	34 600
Profit	786 854	906 416
Equity capital	2 703 421	
% in capital structure	82%	67%
Debt	601 772	1 301 772
% in capital structure	18%	33%
Invested capital	3 305 193	4 005 193
WACC '	3,7%	3,4%
Capital Charge	120 774	
EVA*	666 080	770 942
*neglecting operational costs)	

Figure 5.19: Comparison of initial and EVA maximization solution

After the machines were installed in the second quarter of 2006, additional agent in European Union and distributor in NAFTA were hired. The decision, although not modeled with optimization, had great impact on total sales.

5.4 Results

The firm (firm 2) managed by the author has won the round with significant advantage over its rivals. Figure 5.20 depicts stock quotes throughout the entire simulation.

Furthermore, firm's stock performance was confronted with Economic Value Added, generated throughout the simulation period. The comparisons are depicted in figures 5.21, 5.22 and 5.23.

Management reports for the entire simulation can be found in Appendix A.

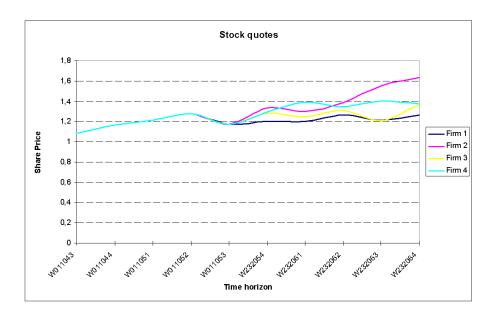


Figure 5.20: Stock Quotes in Global Management Challenge

	W011043	W011044	W011051	W011052	W011053	W232054	W232061	W232062	W232063	W232064
Gross profit	849 064	907 930	896 560	876 827	759 793	783 819	787 372	940 115	1 063 885	1 274 274
Total Overheads	686 959	708 564	698 570	705 036	683 882	710 649	711 729	735 315	770 678	838 715
Operating Income	162 105	199 366	197 990	171 791	75 911	73 170	75 643	204 800	293 207	435 559
Tax	29 540	41 060	40 982	42 834	16 755	16 705	35 421	40 834	74 548	109 038
Amortization	45 586	44 446	43 332	42 252	41 196	40 164	47 912	55 463	54 073	52 728
Depreciation	0	0	0	0	0	0	0	0	0	0
Interest	-18 053	-18 053	-18 053	-18 053	-18 053	-18 053	-22 658	-27 117	-25 711	-20 211
Insurance	0	0	0	31 294	39 189	40 731	112 997	13 892	35 070	838
NOPAT	160 098	184 699	182 288	184 450	121 488	119 307	178 473	206 204	282 091	359 874
Share capital	2 568 287	2 714 952	2 890 053	3 095 521	3 147 597	2 703 421	2 452 341	2 588 453	2 796 946	3 197 238
Share price	1,08	1,17	1,21	1,28	1,18	1,34	1,30	1,39	1,55	1,63
Interest on share capital	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Long-term debt	601 772	601 772	601 772	601 772	601 772	601 772	601 772	601 772	601 772	601 772
Interest on long-term debt	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Tax shield	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Overdraft	0	0	0	0	0	0	302 662	607 139	239 778	(
Interest rate	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Unsecured loans	0	0	0	0	0	0	120 630	0	0	C
Interest rate	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Invested capital	3 170 059	3 316 724	3 491 825	3 697 293	3 749 369	3 305 193	3 477 405	3 797 364	3 638 496	3 799 008
WACC	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Capital charge	74 918	78 475	82 721	87 704	88 966					
						78 195	78 781	83 163	83 526	90 170
EVA	85 180	106 224	99 567	96 746	32 521	41 112	99 692	123 041	198 565	269 704

Figure 5.21: Complete EVA calculations throughout the entire simulation

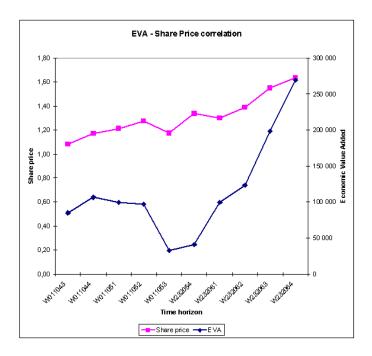


Figure 5.22: Share Price vs. Economic Value Added

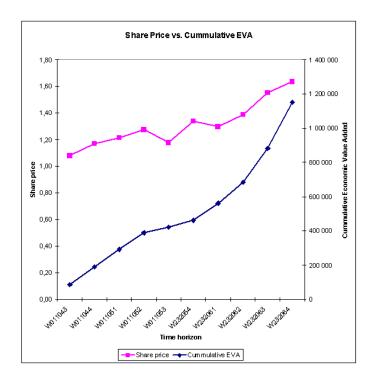


Figure 5.23: Share Price vs. Cumulative Economic Value Added

5.5 Continuation

By winning the first round, the team qualified for the second round of the tournament. It took place from September 1. until the 20. of October 2006. Similarly, all teams were provided with 5 historical management reports, after analysis of which they had to construct the strategy and come up with the first decision set to be submitted.

Historical reports covered the very initial period after the company had been launched. It showed the very first decisions made by the management including purchase of new machines, hiring employees, entering new market etc. The company was selling its products on the Internet market solely.

Apart from streamlining operational effectiveness, the team had to decide whether to expand its operations on new markets. Business intelligence suggested that the Internet market was rather small, initial rapid growth curbing at a constant level. The team's strategy was to enter EU and NAFTA markets immediately. Firm's production capacity was hardly sufficient to satisfy demand on the Internet market with two-shift working, so the capacity was decided to be initially doubled and intended to be tippled throughout the simulation. Since in case of the Internet entering the market took 3 quarters to establish a reasonable demand, the team decided to shift its production capacity from producing for the Internet to producing for EU and NAFTA in order to gain a demand advantage over its rivals. Furthermore, since sacrificing the Internet demand was considered a radical move, the team expected initially little competition and supply of products in the new markets and consequently decided to significantly increase products prices in those markets.

Firm was financed entirely by equity capital. The company still owned much assets in the form of cash brought initially as seed capital by firm's owners. There has not been enough cash, however, to finance the purchase of new machines, so debt had to be incorporated into firm's capital structure. Furthermore incorporating debt decreased firm's weighted average cost of capital.

Even though rival companies were careful about entering new markets and therefore there was little competition and low supply of products, initially the demand in those market was far lower than the team had expected. Consequently, after first decision there was a substantial amount of unsold products stored in commercial storage in EU and NAFTA. Simultaneously, the firm lost market share on the Internet, which all led to radical drop of revenue and threatened firm's financial liquidity.

The team decided to abandon further machine purchases focusing on maintaining financial stability while streamlining operating effectiveness. Ironically, within the next quarters the demand for com-

pany's products in EU and NAFTA markets started to grow rapidly, it was, however, already to late to make new machine investments. The company was unable to satisfy the demand for its products and eventually lost the second round.

The round therefore proves, that operating effectiveness solely is not enough, that to win the company needs thorough knowledge of the market, to build a strategy, that gives an advantage over its rivals and furthermore enough courage to comply to it despite initial adversities. A research conducted by Michael E. Raynor of Deloitte Consulting shows that strategies of successful firms have most in common with strategies of companies that suffers a defeat. [22] Radical strategy, he writes, is about guessing what the market will be like in the future.

Chapter 6

Conclusions

The goal of the thesis was to show how optimization could be used with Value-Based Management aiming at share price maximization. Using the Global Management Challenge tournament as a stock-market environment, the thesis modeled decision problems faced in the game and solved for optimality under VBM paradigms.

The report documents the research flow, that went from thorough understanding of rules of the simulation, through the theory behind Value-Based Management to finish up with optimization models, that embraced the theory to make value-based driven decisions.

Chapter 2 described the managerial environment. The chapter covered all aspects of the simulation: firstly it provided an overall introduction to the game, followed by detailed rules governing production and distribution, marketing, human resources and finance departments of the virtual firm.

Chapter 3 introduced the concept of Value-Based Management. It covered the necessary theory and provided detailed and technical description of Economic Value Added - one of the most renowned value-based performance metrics. The chapter guided through the technicalities of EVA describing necessary adjustments that needed to be incorporated to Net Operating Profit After Tax to arrive from accounting to firm's true economic profit. It also introduced relevant corporate finance concepts, necessary for understanding firm's capital structure and its impact on EVA.

Chapter 4 illustrated how optimization could be used to solve decision problems with value-based management paradigms in mind. The chapter introduced decision environment, describing problems that needed to be tackled with optimization. It then provided optimization models, which served shareholders' wealth creation.

Chapter 5 showed models described in chapter 4 in action. Firstly, the chapter described firm's business context, based on 5 historical management report that the teams were supplied with. Secondly, the chapter guided through the findings of the models.

6.1 Research contribution

Global Management Challenge provided competing teams with the opportunity to manage virtual companies in a simulated, competitive market environment. The firm was a joint-stock company, whose performance was evaluated on share price quoted at the stock exchange. The teams could therefore experience complex decision problems faced at different levels of organization, from low-level operational tactics such as how much of a certain product to produce, to high-level strategic ones, such as what unique position to take in the market, to achieve competitive advantage over its rivals.

Although as a simulation GMC was driven by a deterministic stock valuation model, its complexity and competition-wise relative dependence provided the teams with high degree of nondeterminism. Consequently the market resembled a black-box, whose post-facto result analysis always found rational, though distinct explanation of stock price behavior.

Addressing this "stochastivity" instead of regressing the valuation model, a proved management approach has been adopted to provide decision-making framework, leading to stock-market value maximization.

VBM promotes operational effectiveness as one of the main drivers of Economic Value Added. The thesis showed the impact of optimization driven operations on Economic Value Added. The models have confirmed VBM premises that effective resource allocation and utilization translates to the increase of price of share.

The thesis has also shown how optimization can be used to restructure firm's financing, arriving at optimal capital structure, that minimizes capital cost. A model has been proposed which maximized Economic Value Added through lowering of production costs by increasing production capacity. The capacity has been augmented by purchasing of new machines, whose financing influenced firm's cost of capital.

Value-based management supported by optimization has proved to be a good driver of firm's stock price. The simulated stock-exchange environment of Global Management Challenge has shown strong correlation between shareholders' value measured by EVA and firm's stock performance. The quantitative nature of VBM, made it easy to model and solve decision problems for optimality.

The second round of GMC showed that for a firm to succeed it needs its operational effectiveness to be reinforced with strategy clearly defining firm's unique position in the market, simultaneously providing it with competitive advantage. Such unique position could be specialization, or focusing on particular market. Finding this unique position requires however sound knowledge of current market, but also certain ability or simply luck to foresee what the market will be like in the future. A research conducted by Deloitte indicates that the strategies of successful firms have had most in common with strategies of firms that have failed. [22] The fact is referred by Michael E. Raynor, as peculiar strategic paradox. The strategic radicalism that has driven Wall-Mart or Apple to success, has proved to fail in case of K-mart or Sony. Radical strategy is about guessing which scenario of market development would come true. Analogically, firm's success in Global Management Challenge depends on the compliance of radical actions being the consequence of initial market expectation, with market conditions that materialize.

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Appendix A

Management reports

A.1 Historical management reports

A.1.1 Quarter III '04 Report (W011043)

Company Identity Vear 2004 Quarter 3 Available Lat Outster September 5 Available Lat Outster Company Identity Vear 2004 Countries Countries Available Lat Outster Countries Countries Available Lat Outster Countries	GMC HISTOR	and the latest									CIROL DIO	TIRST HISTORY GUARTER	עצ	
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PLEASE CHECK THE DECISIONS GIVEN BELOW Product 2 Product 3 Product 2 Product 3	GMC HISTOR	≿ ≥												
Product THE DECISIONS GIVEN BELOWN	GMC HISTOR													
PLEASE CHECK THE DECISIONS GIVEN BELLOW PRODUCT AND ANALAGEMEN SAVIBBLE LAST CLUSTERS PRODUCT ANALAGEMENT A USE OF STATES												İ		
Product Prod		PLEASE CHECK 1	THE DECI:	SIONS GIVE	N BELOW		AVAILABILITY & L	USE OF RES	OURCES		PRODUCT MC	OVEMENTS &	AVAILABIL	Ł
Composite times Composite	antities of Product to			Product 1	Product 2	Product 3	Machines Available Last	Quarter		9			Product 2	Product 3
Assembly Workers Hours 1500 275 150 15		'U Agents		929	320	175	Machines Available for N	lext Quarter		9	Quantities:			
Total Number for Payment Distributors 1100 100		lafta Distrbutors		200	275	150					Scheduled	2 225	1 225	900
Total Note Name 275		nternet Distributor		1100	009	275	Assembly Workers Hou	ILS			Produced	2 303	1 269	62
Corporate Image 275							Total Hours Available L.	ast Quarter		12 936	Rejected	78	44	22
Second Composed Composed Commission Co							Hours Absenteeism/Sic	ckness		263	Lost/Destroyed	0	0	0
Corporate Image 275			F	275	440	999	Total Hours Worked La	st Quarter		10 923				
Composite mage Direct Product Advertising Machine Hours Early		lafta		275	440	999	Notice of Strike Weeks ?	Next Quarter		0	Shipped to:			
Corporate Image Direct Product Advertising Total House Available Last Quarter 6 5622 Internet Distributors 500	3	nternet		270	435	099					EU Agents	625	350	175
Corporate Image Direct Product Advertising Total Hours Swalable Last Quarter Sign Direct Product Advertising Total Hours Swalable Last Quarter Sign Direct Product Advertising Total Hours Swalable Last Quarter Sign Direct Product Advertising Sign Advertise Country Sign Sig							Machine Hours				Nafta Distributors	909	275	40
Fig. 6 Fig. 6 Fig. 7 F	rertising (€ '000')	Corporat	le Imagel	Dire	ect Product Adverti	Sing	Total Hours Available L.	ast Quarter		6 552	Internet Distributor	1 100	009	27
Fig. 6 Fig. 6 Fig. 7 F	E		9	9	9	9	Hours Breakdown			26				
Second Colored Color	Nafta		ی	9	9	9	Hours Planned Mainten	nance		83	Orders from:			
Part	Internet		9	9	9	9	Total Hours Worked La	st Quarter		5 648	a	922	432	25
Next Cutting 160 320 Rew Material Units Used Available 422 Sold to: 626 Sol							Average Machine Efficit	ency %		91	Nafta	627	337	182
Next Charlet 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 20 20 20 20 20 20 2	embly Times (minute	(S)		110	160	320					Internet	1380	773	8
15 20 Opening Stock Available 422 501 to 505	e up Product Improv	ements		0	0	0	Raw Material Units Use	ed & Availah	e					
Next Quarter Support	D Expenditure (€ '00)	6		20	15	20	Opening Stock Availabl	e		492	Sold to:			
Note Outlier Note Country Country Note Coun							Bought Spot Last Quar	ter		8 000	EU	625	390	175
	chasing		Ne	d Quarter 3	3-months hence 6-1	months hence	Bought Default Last Qu	larter		0	Nafta	200	275	#
Total Number Support Clearing Stock Last Ounter 6707 Order Backlog Clearing Stock Last Ounter 1734 Order Backlog 122	Raw Materials Orde	red (1000)		80	0	0	Lost/Destroyed			- 15	Internet	1 100	009	27
Wanded to Support Commission For Delang Stock Last Gourter 1734 Corte Backton 122							Used Last Quarter			2029				
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Next Charter Next			Š	'anted for	Payments	%	For Delivery Next Quarte	1			EU	122	88	42
1 10 10 10 10 10 10 10	ents and Distributors		Ne)	d Quarter	(€ 000)	Commission	Bought Last Quarter			0	Nafia	88	49	
Number of Ports Operated For Delivery Quarter after feet For Delivery Quarter after a	EU Agents			-	0	0	Bought Quarter befor	e Last		0				
Comparison Com	Nafta Distr	putors			ρ!	8	For Delivery Quarter after	r Next			Warehouse Stocks	1		
Number of Ports Operated S Human Resource Management Jumers Jumer	Internet Dis	stributor	1	XXXXX	12		Bought Last Quarter			0	2 :	0	0	
10 Warmen of Profits Operation 2 Human reference 2 Hum	The second secon			***************************************		L					Natta	5 0	0	
100 Assembly Workers Target Control 100	duction Machines to	800	-	Number (or Ports Operated	2 0	Human Resource man.	agement	2		memer	0	9	
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6 6 6 Assembly Violetes Tained 0 Dismissed 1 0 0 0 0 0 0 0 0 0	menance Hours per mic	uto (ff.c.)	100		Shift I mad	C	Trained from Unemploye	pu	0 0		mnrmements	MINIOR	MONE	MINOR
10 Term Loans (# 1000) Term Loans (# 2000) Term Loans (# 2	embly Workers Hired (+) / Fired (-)	0	Assembly	v Workers Trained	0	Dismissed		0	0				
120 Term. Loose (# 000) 20 Available for Next Ouanter 22 41 Guarantee 66							Quit at end of Last Qua	irter	0	2	Serviced under			
Total % Deviced of Paid 3 Appertis & Distributors EU Nath Intermet	estments (+/- € '000)		0	Term	Loans (€ 1000)	0	Available for Next Quart	ter	22	41	Guarantee	98	99	27
Hydry 1 Information on Market Shares 0 Agents & Destinations EU Naft a literant Internet Service 160 not for Last Ounder 1 1 1 1 1 1 160 Nations Port a death of the control of the contr	nagement Budget (€	(000	120		% Dividend Paid	m								
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	mber of Internet VISITS	carried through su	(ICCESSION)		2/6/7		Available for INEXT LITE.			Ī	No. of Loads	n	4	
	of Potential Internet Vis	sits that failed to co	onnect		ຄຸ					Ī			Ī	

Figure A.1: Historical Management Report W011043 a

1,10,10,10,10,10,10,10,10,10,10,10,10,10	Profit & Lower 1	72 000 Point 1 tons 11 12 12 13 13 13 13 13	Allahore Sheet Alla	Cash Flow Statement Cash Flow Statement Statement Leavent Cash Flow Statement Leavent Cash Flow Flow Flow Flow Flow Flow Flow Flow
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Comparison Com	100 100	00.00 00.0	Term Loads 2 16 15 15 15 15 15 15 15	Overdate Linit Next Outster (6) 655000 Bonning Power Next Outster (6) 23 000 Raw Material Prices (US) per 2000 units) Sign Prices (US) per 2000 units) Sign Prices (US) per 2000 units)
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1	10.05 10.0	200 200 200	Company Number	
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10 10 10 10 10 10 10 10	10 10 10 10 10 10 10 10	23	Value of Product Stock	
2 2 2 2 2 2 Debtos Debt	2 2 2 2 2 2 2 2 2 2	10.00 10.00 10.00	Value of Raw Material Stock	
Care	Care	2 2 2 2	Debtors	
1	1		Cash	
1	12 12 12 12 12 12 12 12	Activity - Paid for Information	Imestments	
75.000 7	72.000 2.000 72	1 2 3 4	Liabilities	
55.00 55.00 56.0	55.00 55.00 56.0	72 000 72 000 72 000 72 000	Tax Assessed & Due	
Bank Own Carlotte (Description) Carlotte	Bank Own	69 55 000 55 000 55 000 55 000	Creditors	
Discussion Dis	Disease Dise		Bank Overdraft	
1			Unsecured Loans	
Charles Char	Fee Log Fee		NetAssets	
Compared	Mark	****	Tem Loans	
Control (deseasonalised) Control (deseasonal	EU	AND DAYS NAME AND	Net Worth	
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3.40 3.20 10.5 49,00 89.00 28,00	3,40 3,20	2.747	BUSINESS REPORT	
1,05 49,00 59,00 28,00	2	3,40	The European economy is falling to increase its growth	rate.
49,00 59,00 28,00	9	1,05	Interest rates may have to be cut to encourage growth.	
	49,00 59,00 28,00	49,00 59,00	Small companies are demanding action to boost sales.	

Figure A.2: Historical Management Report W011043 b

A.1.2 Quarter IV '04 Report (W011044)

	COMPANIE OF THE PARTY OF THE PA										TOPINO MUO		
GMC HISTORY GMC HISTORY	ORY			Group	Company	Identity	Year	2004	Quarter	TRS HIST	FIRST HISTORY GUARTER	r	
GMC HISTORY GMC HISTORY GMC HISTORY	ORY ORY			<u> </u>									
	PI FASE CHECK THE DECISIONS GIVEN BELOW	K THE DEC	ISIONS GIVE	N BEI OW		AVAII ABII ITY & HSF OF RESOURCES	IISE OF BES	DIIRCES		PRODICT MOVEMENTS & AVAILABILITY	WEMENTS &	AVAII ABII	≧
Quantities of Product to	th the care		Product 1	Product 2	Product 3	Machines Available Last Quarter	st Guarter	20100	2		Product 1	Product 2	Product 3
make and ship to:	EU Agents		029	385	300	Machines Available for Next Quarter	Next Quarter		0	Ouantities:	Т		
Wot delivered in	Nafta Distributors	,	099	275	175					Scheduled	2 420	1 290	702
full if starred)	Internet Distributor	or	1200	099	325	Assembly Workers Hours	ones			Produced	2 505	1337	725
						Total Hours Available Last Quarter	Last Quarter		12 936	Rejected	98	47	25
						Hours Absenteeism/Sickness	Sickness		275	Lost/Destroyed	0	0	
Prices (f):	na na		275	440	999	Total Hours Worked Last Quarter	Last Quarter		12 025				
	Nafta		270	435	099	Notice of Strike Weeks Next Quarter	s Next Quarter		0	Shipped to:			
	Internet		270	435	099					EU Agents	029	365	200
						Machine Hours				Nafta Distributors	220	275	17.
Advertising (€ '000)	Corpc	Corporate Image		Direct Product Advertising	ising	Total Hours Available Last Quarter	Last Quarter		6 552	Internet Distributor	1 200	099	326
B		9	9	9	9	Hours Breakdown			68				
Nafta		9	ဖ	ω	ယ	Hours Planned Maintenance	enance		9	Orders from:			
Internet		9	9	9	9	Total Hours Worked Last Quarter	Last Quarter		9 186	na na	098	88	26.
			077	900	000	Average Machine Efficiency %	ciency %		91	Naffa	718	3/3	204
Assembly Times (minutes)	ures)		2 0	200	320	David Made de l'Inde	and a described			memer	1775	909	174
Take up Floudet Implovements	Overnents	İ	9 8	ي د	9 6	Raw Material Units Used & Available	Ised & Availar	2	1 734	- File 3		Ī	
n expendingle (c	non		8	0	02	Rought Snot Lest Duster	anne		8 000	3010 (U):	670	355	000
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Raw Materials Ordered (700)	(000) parap.		00	0	0	Lost/Destroyed			0	Internet	1200	99	325
						Used Last Quarter			7 354				
		L ^o	Total Number	Support		Closing Stock Last Quarter	luarter		2 380	Order Backlog			
		_	Wanted for	Payments	%	For Delivery Next Quarter	ter			EU	156	88	52
Agents and Distributors	22	Š	Next Quarter	(€ 1000)	Commission	Bought Last Quarter	je.		0	Nafta	126	92	2
EU Agents	nts		-	0	9	Bought Quarter before Last	ore Last		0				
Nafta D	Nafta Distributors		-	9	2	For Delivery Quarter after Next	ter Next			Warehouse Stocks			
Internet	Internet Distributor		XXXXX	12	Ε	Bought Last Quarter	Je.		0	EU Note	00	0 0	
Production Machines to Buy	to Buy	0	Number	Number of Ports Operated	LC.	Human Resource Management	nagement	Amend	Bothirth	Internet	0	0	0
Machines to Sell	to Sell	0	Web-site Development (§ 100)	coment (61000)	22	Personnel at Start of Last Quarter	ast Quarter	2	41		ů.		
Maintenance Hours per Machine	Machine	8				Recruited during Last Quarter	. Quarter	0	7	Product			
Assembly Hourly Wage Rate (€.c)	· Rate (€.c)	10,01		Shift Level	2	Trained from Unemployed	byed	0	0	Improvements	MINOR	NONE	MINOR
Assembly Workers Hired (+) / Fired	(+) / Fired (-)	0	Assembl	Assembly Workers Trained	0	Dismissed		0	0				
						Quit at end of Last Quarter	uarter	0	2	Serviced under	0.00	00000	
Investments (+/- € '000)		0	Term	Term Loans (€ '000)	0	Available for Next Quarter	arter	22	41	Guarantee	68	51	25
Management Budget (€ '000)	(€ 1000)	120		% Dividend Paid	0								
nformation on Corporate Activity	rate Activity	-	Information	Information on Market Shares	0	Agents & Distributors	2	Nafta	Internet	Internet Service			
nsurance Plan Number	je.	-				Available Last Quarter				Complaints	168	22	37
						Quit Last Quarter	0	0	0				
Information Technology Report for Last Quarter	gy Report for Las	st Quarter				Dismissed Last Otr.	0	0	0	Transport	8	Nafta	Internet
Number of Internet Communications Ports Operated	mmunications Port	ts Operated		2		Recruited for Next Otr.	0	0	0	Average Journey(km)	1 594	900	30
Number of Internet Visits carried through successfully	its carried through	successful	ly.	25 451		Available for Next Otr.	-	-	-	No. of Loads	2	4	
% of Potential Internet Visits that failed to connect	Visits that failed to	connect		t.									

Figure A.3: Historical Management Report W011044 a

National Engineering National Engineering	The first and th	1922 000 000 000 000 000 000 000 000 000	perty chines sseris duct Stock w Material Stock	250 000	Cash Flow Statement Trading Receipts Capital Receipts Inferrest Received	1652481
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ws (102 387) 102 387 102 027 102 027 103 027 104 027 105 027 106 027 107 027	Papering Stock Value Addressing Stock Value Addressing Stock Value Search Value Search Value Search Value Search Value Search Value Search Value Search Sear	310 80 81 139 84 95 84 9	Stock erial Stock		Capital Receipts Interest Received	
900 120 0577 120 0577 120 0577 120 0577 120 0500 12 0500 13 120 0500 14 410 15 120 0500 16 125 050 17 125 050 18 120 0500 18	Addressis Specing Stock Value Addressis Specing Stock Value Addressis Specing Specing Stock Value and Specing Speck Value and Cleaning Cost Specing Speck Value and Cleaning Specing Spec	139 06 139 06 139 06 16 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	Stock erial Stock		Interest Received	C
200077789 20007789 200078 2000078 200078 200078 200078 200078 200078 200078 200078 200078 200	Addressing Purchases Searniby Vages Eleminas Vages Addressing Sock Vay Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social Social	310 BS 251 86 251 86 99 86 88 90 784 99 907 95	Stock erial Stock	Ľ		0
12 427 19 240 19 240 26 410 26 410 15 500 11 250 11 250 11 250 10 000 19 700 564 700 564 700 564 700 564 700 564 700 564	searribly Wages activities Wages also provided the Searribly Wages also Control and Contro	138 68 29 165 99 18 90 18 90 18 90 907 99	Value of Product Stock Value of Raw Material Stock Debtors Cash	13633/6	Irwestments Sold	0
19 240 19 240 19 15 200 10 200 11 630 11 640 12 640 13 10 10 14 410 15 20 110 16 20 110 20	catchinists wegate Cost Aduction Running Cost Aduction Running Cost and Aduction Running Cost and Cost of Cost	25165 9968 8980 08390 78496 90795	Value of Raw Material Stock Debtors Cash	0	Insurance Receipts	0
2 55 000 1 5 500 1 5 500 1 5 500 1 2 500 1 2 500 1 2 500 1 2 500 1 2 500 1 2 500 2 2 119 7 20 564 1 2 500 2 2 119 7 2 500 2 2 109 2 2 600 2 2 600	Astribie Rouming Cost Astribie Rouming Cost 1st of Sales 1st of Sales	99 86 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Debtors	83 947	Additional Loans	0
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2000 16 30 17 50 17 50 17 50 17 50 18 30 19 64 20 10 20 00 20 00	The control of the co	907 95		4/4 325	Irading Payments	1515328
seing (1,5 30.0	ses Profiliuss Profiliuss Profiliuss Profiliuss Profiliuss Profilius Profiliuss Profiliuss Assessed As	744 955 907 930 0 0 18 053 770 cc4	Imestments	0 000 000	Capital Payments	0.000
aning 1,502 1,502 1,502 1,253	Profit/Loss Isurance Receipts Isurance Receipts Isurance Receipts Isurance Receipts Isurance Receipts Isurance Receipts Isurance Received Isurance Received Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Reserves Isurance Received Reserves Isurance Received Reserves Isurance Reserves Isurance Received Reserves Isurance Received Reserves Isurance Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Reserves Isurance Received Received Received Reserves Isurance Received Reserves Isurance Received	907 930 0 0 18 053	Total Assets	3 238 b32	Merest Paid	18 023
2 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 600 7 7 7 600 7 7 7 7	Sear India Loss Sear India Loss Telerat Receipts Telerat Receipts Telerat Paid Telerat Paid Telerat Paid Teleration Te	0 0 0 18 053	Linkillston		Tow Doid	0
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Costs 32 119 700 564 ccumulated 364 343	Vertheads ax Assessed th ProfitLoss Widends Paid ansferred to Reserves 4 5	700 504	Insecured losse		Net Cosh Flow	119 100
709 564 ss Accumulated 364 343 d 2.067	Pepreciation ax Assessed tr Profit/Loss hindends Pand ansferred to Reserves	1000	Total Current Liabilities	466 293		
ss Accumulated 364 343 dd 2 087	ax Assessed t Profit/Loss inidends Paid ansferred to Reserves	44 446	Net Assets	2 842 399	Overdraft Limit Next Quarter (E)	392 000
364 343 0 2 087	t Proft/Loss Midends Paid ansferred to Reserves 4 5	109 302	Term Loans	801 772	Borrowing Power Next Quarter (€)	177 000
2 087	it Profit/Loss hindends Paid ansferred to Reserves 4 5		Net Worth	2 240 627		
2087	Shidends Paid ansferred to Reserves 4 5	27 565	Share Capital	2 000 000	3	nits)
2.087	ansferred to Reserves	0	Reserves	240 627	Spot Price 3-Month	6-Month
		27 565	Shareholders Funds	2 240 627	37 116 36 638	36 287
ARE PRICES & DIVIDENDS			% of Market Share by Products Sold - Paid for Information	ld - Paid for Information	NOT REQUESTED	
			Campany			
1170 1170 1170						
-			e ten			
			Internet			
BUSINESS INTELLIGENCE			Product 2: EU			
Free Information on Companies' Activity						
1 2			Internet			
275 275			Product 3: EU			
270			Nafta			
B 270 270			Internet			
440 440						
e) 435 435			ALL COMPANY BALANCE SHEETS			
s (e) 435 435			Company Number			
Product 3: EU Price (€) 665 665 665	999		Assets		NOT AVAILABLE THIS QUARTER	QUARTER
099 099 6			Value of Property			
099 099 @			Value of Machines			
63			Value of Product Stock			
10,00			Value of Raw Material Stock			
2 2			Debtors			
			Cash			
			Imestments			
2 3	4		Liabilities			
Total Advertising Spend (€) 72 000 72 000 72	72 000 72 000 27		Tax Assessed & Due			
92 000 99 000 99	92 000 92 000 93		Creditors			
dar Ratings			Bank Overdraft			
			Unsecured Loans			
* 1			NetAssets			
			lem Loans			
			Net Worth			
TORIGOTO INTERNATIONAL	VI WILLIAM	7	Share Capital			
set Ouarter (deseasonalised)	4 457	Rest of Developed world	Shareholders Funds			
% Unemployment Rate Last Quarter (deseasonalised) 2,70	4.10					
	3115		BUSINESS REPORT			
lext Quarter	3,00		Europe is expecting to perf	Europe is expecting to perform well over the next year or two		
arter			Germany in particular is ex	Germany in particular is expected to shrug off the effects of		
% Access of Population to PCs 49,00	00'09	38,00	economic downturn with co	economic downturn with consumer and corporate confidence		
			increasing.			

Figure A.4: Historical Management Report W011044 b

A.1.3 Quarter I '05 Report (W011051)

Company Nearthy Year 2005 Oustled 1	GMC HIST	SMC HISTORY									THIRD HIST	THIRD HISTORY QUARTER	ER	
Product Prod	GMC HIST	ORY			Group	Company	Identity		2005	Quarter	-			
Price Product Produc	GMC HIST GMC HIST	ORY												
Product Prod	GMC HIST	ORY												
Product in Product Pro														j
Properties Pro	1 03	PLEASE CHECI	K THE DE	CISIONS GIVE	N BELOW	0	AVAILABILITY &	USE OF RES	OURCES	6	PRODUCT MA	OVEMENTS &	AVAILABIL	الم
Comparison Control C	antities of Product	2		Product 1	Product 2	Product 3	Machines Available Las	t Uluarter		ه م		-	T	Product 3
Agenthity Morkers Hours 1296 124 1	nake and ship to:	EU Agents		0/9	3/0	000	Machines Available for I	Next Guarrer	İ	٥	Quantities:	00.0	100,	f
Total Number Comment	t delivered in	Natta Distributors		38 88	9/2	37.2	A				Scheduled	2 420	800	100
Corporate Image	if starred)	Internet Distribut	or	1200	nça	372	Assembly Workers Ho	SIN	İ	00000	Produced	2505	1 342	7)
Corporate Image 275							lotal Hours Available L	Last Quarter	Ī	12.936	Rejected	8	4/	7
Total Number of Posts Office Formula For							Hours Absenteeism/Si	ickness		319	Lost/Destroyed	0	0	0
Support 200 455 880 Natice of Stifice Week's Next Quarter 0 Stifice of Stifice 0 Stifice of Stifice 0 Stifice of Stifice 0 Stifice of Stifice 0 Stifice of Stifice 0 Stifice of Stifice 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice of Stifice Week's Next Guarter 0 Stifice week's Next Guarter 0 Stif	Prices (€):	2		275	440	999	Total Hours Worked La	ast Quarter		12 039				
Compared Inspect 200 455 680 Machine Hours 500 680 Machine Hours 500 680 Machine Hours 500 680 Machine Hours 500 680 Machine Behaviors 500 680 Machine Distributors 500 680 Machine Behaviors 500 680 Machine Behaviors 500 680 Machine Behaviors 500 680 Machine Behaviors 500 Machine Behavior		Nafta		270	435	98	Notice of Strike Weeks	Next Quarter		0	Shipped to:			
Corporate Image Direct Product Advertising Total House Worklighe Last Counter 6 65 65 Internet Distributor 1.20 1.50 1		Internet		270	435	999					EU Agents	029	370	200
Composite marger Direct Product Abpertison Contact House Analote Last Quarter E							Machine Hours				Nafta Distributors	250	5//2	17
Fig. 6 Fig. 6 Fig. 6 Hours Beakford List Charlet Fig. 7	vertising (€ 1000)	Corpo	rate Image		ect Product Adverts:		Total Hours Available L	Last Quarter		7959	Internet Distributor	1 200	059	35
6 6 6 6 6 6 6 6 7 7	2		ယ	9	ω	9	Hours Breakdown			85				
Second Color	Nafta		ڡ	9	9	ဖ	Hours Planned Mainte,	nance		86	Orders from:			
Next Charlet 100 150 200 New Material Intelligency % 90 Nath	Internet		9	9	9	9	Total Hours Worked Li	ast Quarter		6 228	200	727	397	219
10 150 200 150 200 150 200 150 200 150 200 150 200 150 200 150 200							Average Machine Effic.	iency %		06	Nafta	648	88	99
Next Outside 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 15 20 20 20 20 20 20 20 2	embly Times (min	ntes)		110	160	320					Internet	1311	200	88
December December	ce up Product Impi	ovements		0	0	0	Raw Material Units Us	sed & Availat	ale					
Next Ouanier Next Ouanier Support Security Se	D Expenditure (€	(000,		8	15	20	Opening Stock Availab	ale		2 380	Sold to:			
Next Outpute Strong Provide Strong		8					Bought Spot Last Qua	rter		8 000	8	029	370	200
Total Number Support Constitution Support Constitution	chasing		z		3-months hence 6-r.	nonths hence	Bought Default Last Q.	uarter		0	Nafta	220	275	17
Total Number Support Contact Last Quarter 7,994 Order Backing Contact Ba	Raw Materials Or	dered (1000)		80	0	0	Lost/Destroyed		İ	0 .	Internet	1200	99	32
Warefulner War			F	The second second			Used Last Glaner	1	Ì	7 304		l		
Next Control Period Peri				otal Number	Support		Closing Stock Last U.	Jarter	İ	3 UTb	Order Backlog	000	-	
Next Guarder (# UM) Commission Bodgil Last Outsider Notice Next Guarder				Wanted for	Payments	%	For Delivery Next Quart-	er.		ľ		90 :	8	S.
1 10 10 10 10 10 10 10	ents and Distributo	2	2	ext Quarter		Commission	Bought Last Quarter			0	Nafta	112	28	
Number of Posts Operated 10 10 10 10 10 10 10 1	EU Age	uts			2 9	2	Bought Quarter befo	re Last	İ	0			Ī	
Number of Pots Operated 1	Naffa D	stributors			2 (0.00	For Delivery Guarter after	er Next		c	Warehouse Stocks	c	C	
Number of Ports Operated 5 Human Resource Management Management Management (1900) Web-site be-expected (1900) 22 Personnial state of Last Outrier 22 Tained from Unemployed 0 0 Term Loans (1900) 0 0 Term Loans (1900) 0 0 Term Loans (1900) 0 0 0 Term Loans (1900) 0 0 0 0 0 0 0 0 0	internet	Distributor		XXXXX	7		Dought Last Guarter	0		5	0 2	0	0	
10 Mea-size everyperate (1900) Personate and State of Last Outside 10 Mea-size everyperate (1900) Personate at State of Last Outside 10 Producer 10 Measure 10 Measure everyperate (1900) Personate at State of Last Outside 10 Measure	duction Machine	0.0	c	Mumbor	of Bosto Oncorpor	ы	Human Dogueso Man	- tuomout	Г	The second	lotomot	0 0	0 0	
3 Product	Machines	to Sell	0 0	Web, ete Devel	on route Operated	3.5	Personnel at Start of I	act Charter	2					
10 Assembly Worker Tained 2 Trained from Unemployed 0 0 Improvements MACR MACR	ntenance Hours per	Machine	3.0		()		Recruited during Last (Quarter		7	Product			
d Demicsed Demic	embly Hourly Wade	Rate (€c)	10.0		Shift Level	2	Trained from Unemploy	ved	0	0	Improvements	MINOR	MINOR	MINOR
Out at end of Last Quarter Out at end of Last Quarter Out at end of Last Quarter Out at end of Last Quarter Out at end of Last Quarter Out Counter Out Last Quarter Out	embly Workers Hire	(+) / Fired (-)	0	Assembl	y Workers Trained	0	Dismissed		0	0				
120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans & Wood 120 Tem_Loans							Quit at end of Last Qu.	arter	0	7	Serviced under			
Year 1 Information or Market Shares Agents & Distributors EU Nation Internet Internet Internet Recentable Last Outer Internet Complaints Fig Available Last Outer 0 of the stat Outer	estments (+/. € '00C		0	Term	Loans (€ 1000)	0	Available for Next Quar	rter	22	14	Guarantee	94	52	27
Information on Market Sheves 0 Ageinsts Distributions 1 Nation Internet Service 169	nagement Budget	(e 1000)	120		% Dividend Paid	m								
Available Last Quarter 1 1 Complaints 168	ormation on Corpo	rate Activity	-	Information	on Market Shares	0	Agents & Distributors	E	Nafta	Internet	Internet Service			
d 5	urance Plan Numb	er	-				Available Last Quarter	- 0	- 0	0	Complaints	88	9/	88
d 5							Coll Last Guarer	0 0	5 0	0				
23 808 Available for Next Cir. 1 1 No. of Loads 5 33	ormation reconous	gy Kepon for Las	r Quarter				Dismissed Last Ltr.	5 0	5 0	0	Tansport	EU	маща	Internet
23 Available for Next Lift: 1 No. of Loads 5	mber of Internet Co	mmunications Fort	s Uperater	9	n 00 00		Recruited for Next Utr.	5 ,	Ξ,	٥,	Average Journey(km)	1994	me,	8
	mber or internet vis	its carried through	SUCCESSIL	Jil.	908 C7		Available for Next Lift.				No. of Loads	n	4	
	of Potential Internet	Visits that failed to	connect		n n				Ī	Ī				

Figure A.5: Historical Management Report W011051 a

Accounts (Line of Control of Cont	Profit & Loss Sales Revenue Opening Stock	SSO		Balance Sheet		Cook Clear Statement	
tribution Agent Experiment & Provider For Services Services Services Carricological and a control and a contr	Sales Re Opening			The state of the s		The state of the s	
ss si si si si si si si si si si si si s	Opening	dition	1 695 DPC	Ossets		Trading Receints	1 689 698
is sign and	Opening	90	000 000	of Property	250 000	Canital Receipts	900
19 19 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	1444	Stock Value	83.947		1690 044	Interest Received	0
si 1 si 1 si 1 si 1 si 1 si 1 si 1 si 1	Material	Materials Purchased	320 682		1 940 044	Irwestments Sold	0
ig s 1	Assemb	Assembly Wages	139 140	Value of Product Stock	0	Insurance Receipts	0
s s l	Machinis	Machinists Wages	254 063	Value of Raw Material Stock	107 546	Additional Loans	0
ssing 1	Machine	Machine Running Costs	100 239	Debtors	762 371		0.1017
saing (OSIS E Cumulated 1	Cluality Control	Control	8 000	Cash	5/2821	Irading Payments	1513149
ssing cumulated	Minus Cic	Minus Closing Stock Value	300 505	Trial 9 con-	0 200 400	Capital Payments	10 000
asing Costs E	COST OF CARES	Sales	(30.0%)	Olai Assets	2 302 / 022	Interest Pald	conol
Countilated 1	Grose Pre	Stoce Proft/I oco	896 580	Liabilitios		Tev Doid	0
Sosts E		0000	200	Tax Accocod 2. Due	109 302	Dividends Paid	SO OUD
Costs E	Insuran	Insurance Receipts	_	Creditors	354 476	Loans Repaid	0
Costs	Interest	Interest Received		Bank Overdraft	0		
Costs	Interest Paid	Paid	18 053	Unsecured Loans	0	Net Cash Flow	98 496
ss Accumulated	Overheads	spi	698 570	Total Current Liabilities	463 778		
	Depreciation	ation	43 332	Net Assets	2 919 004	Overdraft Limit Next Quarter (E)	401 000
	Tax Assessed	passed	0	Tem Loans	601 772	Borrowing Power Next Quarter (€)	211 000
				Net Worth	2 317 232		
	Net Profit/Loss	Aloss	138 605	Share Capital	2 000 000	∞.	(Stur
Insurance Claimed 44U Insurance Excess 2 067	Transferred to Re	Unidends Paid Transferred to Reserves	76 605	Kesenes Shareholders Funds	2 317 232	Spot Price 3: Worth 36 999 36 548	36 018
						Ш	
ARE PRICES & DIVIDENDS				% of Market Share by Products Sold - Paid for Information	old . Paid for Information	NOT REQUESTED	
Company Number 1 2	3			Company			
1,213 1,21	1,2	1,213					
e				Nafta			
				Internet			
BUSINESS INTELLIGENCE				Product 2: EU			
Companies' Activity				Nafta			
1 2				lute			
275				Product 3: EU			
02/2 02/2				BIRN			
0/7 0/7 (2)8				Internet			
307 307				STUDIES ON THE PRICE CHEETE			
400				ALL COMPANT DALANCE SHEET	0		
Drawlurd 3: Fill Drive (6) 666 666 666 666	8 58	435		Accepte		NOT AVAILABLE THIS DITABLED	CHADTED
000				Volue of Property		NO SAMOON	E LENOS
989				Value of Machines			
63				Value of Product Grock			
10.00	ľ			Value of Day Material Stock			
000				Doleon Marellal Stock			
7				Cach			
Business Activity - Paid for Information				Imestments			
1	4	un		Liabilities			
vertising Spend (®)		72 00		Tax Assessed & Due			
	000 99 00			Creditors			
				Bank Overdraft			
1	:			Unsecured Loans			
*		*		Net Assets			
1				Tem Loans			
ŧ	ŧ			Net Worth			
		4		Share Capital			
4			Rest of Developed World	Reserves			
Gross Domestic Product Last Quarter (deseasonalised) 4 744 % Themphyment Rate Last Quarter (deseasonalised) 2 50	1 5	380	7/ 334	Shareholders Funds			
	100	2006		RIISINESS REPORT			
% Annual Central Bank Base Rate for Next Quarter 3,30	. 8	3,20		Investors are looking at E	Investors are looking at European companies for high returns.		
arter	10			Mid size organisations in	Mid size organisations in France are favoured because of		
	8	00'09	28,00	production efficiencies of	production efficiencies obtained by restructuring and		
				new management.			
				,			

Figure A.6: Historical Management Report W011051 b

$A.1.4\quad Quarter~II~'05~Report~(W011052)$

	GMC HISTORY	ORY										FOURTH HISTORY QUARTER	RER	
Product Prod	GMC HIST	ORY			Group	Company	Identity	Year	2005	Quarter	2			
Processes Proc	GMC HIST	ORY	i											
Process CHECK THE PECKSONNS GNORM STATES Process CHECK THE PECKS	GMC HIST	ORY												
Pubmer P														
Product Prod		PLEASE CHECK	THE DEC	ISIONS GIVE	N BELOW		AVAILABILI	TY & USE OF RE	SOURCES		PRODUCT MA	OVEMENTS 8	AVAILABIL	Ł
1.0 Agenthous 255 270 270 Muchines Available for Next Charlet Bands Control of Charlet Ban	antities of Product	to		Product 1	Ш	Product 3	Machines Available	e Last Quarter		9		1		Product 3
125	nake and ship to:	EU Agents		. 099		200	Machines Available	e for Next Quarter		9	Quantities:			
Total House Distributor 115 650 325 Abeninby Workers House Distributor 12956 Checkers 12956	it delivered in	Nafta Distrbutors		525		175					Scheduled	2 350	1 295	200
Properties 275 440 866 February February 187	if starred)	Internet Distributor		1175 *		325	Assembly Worker	rs Hours		0.0000000	Produced	2 433	1 342	725
Comparison 275							Total Hours Avails	able Last Quarter		12 936	Rejected	83	47	22
1							Hours Absenteers	sm/Sickness		278	Lost/Destroyed	17	0	0
Composite Image 200 Assign Ass	Prices (6):	na na	F	275	440	999	Total Hours Work	red Last Quarter		11 906				
Composite Integrated 200 Recurrence 200 R		Nafta		270	435	099	Notice of Strike We	eeks Next Quarter		0	Shipped to:			
Corporate Image Direct Product Advertising Machine Hours Exact Countries Experiments Ex		Internet		270	435	099					EU Agents	645	370	200
Compared Inneger Compared In							Machine Hours				Nafta Distributors	521	275	17.
Fig. 16 Fig.	rertising (€ 1000)	Corpor	ate Image	Din	ect Product Adver	tising	Total Hours Avails	able Last Quarter		6 552	Internet Distributor	1 167	099	32
Fig. 6 6 6 6 6 6 6 6 7 7	B	3	ڡ	9	9	9	Hours Breakdown			157				
Second Color Seco	Naffa		ص	9	9	9	Hours Planned M	faintenance		23	Orders from:			
Particle 10 160 200 Average Machine Efficiency % 20 Native 130 140	Internet		9	9	9	9	Total Hours Work	ced Last Quarter		6 185	20	773	417	23
Next Charlet Structure 150					,		Average Machine	Efficiency %		8	Nafta	710	371	199
Next Countre 20 Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening Stot Last Countre Opening	embly limes (min	rtes)		0.0	39.	370				ĺ	Internet	DR .	/40	23
Next Charlet Structure hance Bought Stock Available 3.016 Sold for	ce up Product Impi	ovements	Ī	9	5		Kaw Material Uni	its Used & Avails	ple	-			Ī	
Next Charlet Support Brought Spot Last Charlet Support Brought Spot Last Charlet Support Last Charlet Last Charlet Support Last Charlet Support Last Charlet	D Expenditure (€	(00)		R	15	R	Opening Stock A	wailable		3016	Sold to:			3
Next Cuarter Strontish Pance Emonth Pance E							Bought Spot Last	t Quarter		8 000		645	370	R!
Total Number Support Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Table Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Stock Last Guarder Coloring Last Guarder Coloring Last Guarder Coloring Last Guarder Coloring Stock Last Guarder Coloring Last	chasing		ž	ext Quarter	-months hence 6	-months hence	Bought Default La	ast Quarter		0	Naffa	521	5/2	175
Total Number Support Closing Stock Lat Coarter 2724 Order Backlog 117 51	Kaw Materials UI	derea (uuu)		О			Lostvuestroyed			1 200	Internet	/01 -	000	32
Newtod for Payment Watered for Payment			F	tal Mumbar	Support		Closing Stock Lac	of Ousdor		AC7.	Order Backled			
National Courty National C			2 2	Wanted for	Doumonto	70	For Dolivon Nort C	Director	I	+710	Older Dacking	147	ŭ	C
Designation Control	inte and Dietributor	9	No	of Orionter	(e non)	Commission	Boundht I act Ou	Suarier		c	No.	150	5 &	3 00
10 Number of Ports Operated 1 10 10 10 10 10 10 10	FII Age	9 0		To Common		10	Bought Ouster	· hafora act		0 0	3	3	70	
Minches of Ports Open Leg	Nafa Di	stributore			2 0	2 (=	For Delivery Quarte	or after Next		0	Warehouse Stocke			
Number of Ports Operated 5 Human Resource Management Aurel Month Mon	Internet	Distributor		XXXXX	12	3.5	Bought Last Qu	larter		0	E	0	0	
Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Secretaria distinguishment Number of Poperated Number of Poper											Nafta	0	0	
10 Web-ste Development (100) Web-ste Development (10	duction Machines	to Buy	0	Number of	of Ports Operated	-9	Human Resource	: Management		Hadmith	Internet	0	0	
100 Shift Level 2 Trained from Level 0 0 0 Produced unique Level 0 0 0 Produced unique Level 0 0 0 Produced unique Level 0 0 0 Produced unique Level 0 0 0 0 0 0 0 0 0	Machines	to Sell	0	Web-site Develo	opment (€ '000)	22	Personnel at Star	rt of Last Quarter	22	41				
100 Assembly Workless Trained from Unengloyed 0 0 0 0 0 0 0 0 0	ntenance Hours per	Machine	30				Recruited during L	Last Quarter	0	2	Product			
(+) Fined (-) Concept Secretary Workers Trained Count and Class Counter Counte	embly Hourly Wage	Rate (€.c)	10,0		Shift Level	2	Trained from Uner	mployed	0	0	Improvements	NONE	MINOR	MINOR
Term Loan's (© 000)	sembly Workers Hire	d (+) / Fired (-)	0	Assembl	y Workers Trained		Dismissed		0	0				
1000 120 Term. Long (*End) 0 Available for Next Duarter 22 41 Charantee 97 53							Ouit at end of Las	st Quarter	0	7	Serviced under			
Market Shares Against and Shares Market	estments (+/- € '000		0	Term	Loans (€ 1000)	0	Available for Next	1 Quarter	22	41	Guarantee	26	ß	40
Information on Market Shares	nagement Budget.	(e 1000)	138		% Dividend Paid									
Available for Next Off. 1 1 1 1 1 1 1 1 1	ormation on Corpo.	ate Activity	-	Information	on Market Shares		Agents & Distributo		Nafta	Internet	Internet Service			
Outlast Quarter O 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	urance Plan Numb	_a	-				Available Last Qua			-	Complaints	991	92	42
d 25 Described for Next Off. 1 I I No of Loads 4 Hata 61 Hata 61 Hata 62 782 Available for Next Off. 1 I No of Loads 5 4							Ourt Last Quarter			0				
5 Recuted for Next Offic. 0 0 0 Average-bounney(m) 1594 2 7/32 Available for Next Offic. 1 1 1 No. of Loads 5 2.9	ormation Technolo	gy Report for Last	Quarter				Dismissed Last G			В	Transport	В	Nafta	Internet
22 782 Available for Next Gtr. 1 1 1 No. of Loads 2.9	imber of Internet Co.	mmunications Ports	: Operated		ω		Recruited for Next	200		0	Average Journey(km)	1 594	200	8
	mber of Internet Vis	its carried through s	successful	<u>~</u>	22 782		Available for Next (Otr.		-	No. of Loads	w	4	00
	of Potential Internet	Visits that failed to	connect		2,9									

Figure A.7: Historical Management Report W011052 a

	Accounts (Euros)												
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	rheads		H	Prof	it & Loss			Balance Sheet			Cash Flow Stateme	ı	
Control Cont	artisina	72 000		Sale	s Revenue		1 671 390	Assets			Trading Receipts		200 289
Material Production 1975	net Distrbution Agent	101 356						Value of Property	250 000		Capital Receipts		0
100 100	net Service Provider	29 369		ő	ening Stock Va	ene	107 546	Value of Machines			Interest Received		0
Contact Cont	ng Agents & Distributors	112 545		Ma	terials Purchas	pa	325 591	Total Fixed Assets		.35	Investments Sold		0
Control Cont	s Office	19 900		As	sembly Wages		136 480	Value of Product Stock		0	Insurance Receipts		31 294
March Control Contro	antee Servicing	23 020	+	Ma	hinists Wages		756 290	Value of Raw Material		20 2	Additional Loans		
Cont. Character Cont. Char	oing & Hired Transport	22 400	+	ÉĈ	chine Running	Costs	8 000	Cach	/00/	5 5	Trading Baymento		83C FC2
Control Cases Control Case	Site Development	22 000		Min	e Closing Stori	k Value	139 169	Insetmente	8	3 -	Canital Payments		0.2 + 20
	onnel Department	7 000	-	Cost	of Sales		794 563	Total Assets	3 423	224	Interest Paid		18 053
Contact Cont	nine Maintenance	15.300				İ				i	Investments Bought		٥
1	housing & Purchasing	15 925		Gros	s Profit/Loss		876 827	Liabilities			Tax Paid		109 302
Figure F	ness Intelligence	7 500						Tax Assessed & Due		0	Dividends Paid		0
Figure Freedom Freed	t Control	4 328		lns	urance Receipt:	00	31 294	Creditors	7198	140	Loans Repaid		0
	ance	12 285		Inte	rest Received		0	Bank Overdraft		0			
1.00 Communication Commu	gement Budget	120 000		Inte	rest Paid		18 053	Unsecured Loans			Net Cash Flow		62 688
1.	- Miscellaneous Costs	32 108		ð	sheads		705 036	Total Current Liabilities	3817	140			
The Change of the Change of	Overheads	705 036		De	preciation		42 252	Net Assets	30617	984	Overdraft Limit Next (luarter (E)	209 000
				(B)	Assessed		0	Term Loans	.18	72	Borrowing Power Nex	Guarter (€)	165 000
1,	ole Profit/Loss Accumulated	279 385						Net Worth	2 460 0	312			
1,272 2,280 2,28			+	Net	Profit/Loss		142 /80	Share Capital	2000	n i	Kaw Material Prices	US\$ per UUU ur	(2)
1, 25 2, 2	ance Claimed	33.341	+	Trail	dends Paid sferred to Reser	Mes	142 780	Resenes Shareholders Funds	2.460	22	Spot Price 37 078		6-Month 36 107
1.25 1.25													
1	OMPANY SHARE PRICES &	DIVIDENDS						% of Market Share by	Products Sold . Paid for Info	rmation	NOT REC	UESTED	
1, 175 175 125 1	any Number					6		Company					
1	Price (E.c.)												
1	idend Paid					0		Nafta					
Product 2 15 15 15 15 15 15 15								_					
1	ESS INTELLIGENCE												
Product 3 11	formation on Companies' Activ							Nafta					
Mail	any Number					0		=					
	ict 1: EU Price (e)					0.4							
A	Mana Price (c)							BIBN					
Control Cont	Internet Price (5)							Internet					
1.00 1.00	Made Dring (5)					2 10		ALL COMPANY BALAN	or eugere				
March Marc	Mana File (5)							ALL COMPANI DALM	CC SHILLIS				
Nation of Property Nation of Property	ict 3. Ell Price (6)					1		Accents			NOT AV	ABI F THIS O	APTER
Second S	Nafta Price (f)							Value of Property					
1	Internet Price (6)							Value of Machines					
10 10,04 10,05 10,05 10,05 10,05 10,04	Number Employed							Value of Product Stock					
2	whis Wage Date (6 c)							Value of Dev Material	2000				
2 2 2 2 2 2 2 2 2 2	many wage nate (e.u.)					0.0		Dehtors	Olden				
1	0.000	1		4				Cash					
12 2 2 2 2 2 2 2 2 2	ass Activity - Paid for Inform	ation						Investments					
72 000 7	Åu	-	2	m	4	40		Liabilities					
55 00 55 0	Advertising Spend (E)							Tax Assessed & Due					
Best On Best On Best On Best On Best On	Research Spend (E)							Creditors					
March Marc	umer Star Ratings							Bank Overdraft					
Temporary Temp	duct 1	:	1	1		:		Unsecured Loans					
The Part of	duct 2	*	k	٠				Net Assets					
New York New York	duct 3	1	1	:		1		Term Loans					
State of Control of	site Star Rating	ŧ	ŧ	ŧ				Net Worth					
### Outstand 1.0 No.47 N					100000			Share Capital					
Anticonscionated 3 (2007) 2 (2007) 1 (2	JMIC INTELLIGENCE		4		MATIN		Developed World	Hesenes					
Mark Mark	s Domestic Product Last Gual	ner (deseasonal.	4	87.00	45/		27.334	Shareholders Funds					
Accounts 1,000 3,000 000 000 000 000 000 000 000 0	employment Rate Last Guant	er (deseasonalis		200	0,0	5 (4		BIISINESS BEDODI					
in terretal Journal 1/15 July 28:00	ce of External Hade Cast Co.	for Mout Oroston		8 8	200			DUSINESS REFORI	and accordance one observing circumstance	of continuities			
1.70 61,00 28,00	idal Cellia Dalik Dase Rate	Euroc Noxt Ou		1 15	0,00			Some Cubb	domination of the Euro and the	on overneaming			
notine ontine	ange hate of Douglation to DCe	COTOS, NEXT OF		2 8	28		38 W	economies.	nembership of the Euro and its	orie-size iiis			
Unicipal state of the state of								o naiotropan	a menotainable concurred hos	Contraction from the contraction of the contraction			
LI PRINCIPAL MANAGEMENT CONTRACTOR CONTRACTO								The second secon	The state of the s				

Figure A.8: Historical Management Report W011052 b

A.1.5 Quarter III '05 Report (W011053)

GMC HISTORY	ORY									FIFTH HIST	FIFTH HISTORY QUARTER	e e	
GMC HISTORY	ORY			Group	Company	Identity	Year	2005	Quarter	m			
GMC HISTORY GMC HISTORY GMC HISTORY	ORY ORY												
	PLEASE CHECK THE DECISIONS GIVEN BELOW	THE DEC	SISIONS GIVE	N BELOW		AVAILABILITY	AVAILABILITY & USE OF RESOURCES	OURCES		PRODUCT MOVEMENTS & AVAILABILITY	VEMENTS 8	AVAILABIL	Ł
Quantities of Product to	5		Product 1	Product 2	Product 3	Machines Available Last Quarter	ast Quarter		9		Product 1	Product 2	Product 3
make and ship to:	EU Agents		640	365	+ 091	Machines Available for Next Quarter	or Next Quarter		٩	Quantities:			
(Not delivered in	Nafta Distrbutors		920	270	130 *					Scheduled	2 310	1 285	206
full if starred)	Internet Distributor		1150	099	225 +	Assembly Workers Hours	Hours			Produced	2 391	1 332	52
						Total Hours Available Last Quarter	le Last Quarter		12 936	Rejected	16	47	_
						Hours Absenteeism/Sickness	/Sickness		528	Lost/Destroyed	0	0	62
Prices (6):	E		275	440	999	Total Hours Worked Last Quarter	d Last Quarter		10 725				
	Nafta		270	435	099	Notice of Strike Weeks Next Quarter	ks Next Quarter		0	Shipped to:			
	Internet		270	435	099					EU Agents	640	386	131
						Machine Hours				Nafta Distributors	520	270	Ξ
Advertising (€ '000)	Corpor	Corporate Image		Direct Product Advertising	tising	Total Hours Available Last Quarter	le Last Quarter		6 552	Internet Distributor	1 150	099	19
EU		9	9	9	9	Hours Breakdown			28				
Nafta		9	9	9	9	Hours Planned Maintenance	ntenance		93	Orders from:			
Internet		9	9	9	9	Total Hours Worked Last Quarter	d Last Quarter		5 880	20	777	400	22
						Average Machine Efficiency %	fficiency %		87	Nafta	229	38	206
Assembly Times (minutes)	ntes)		110	190	320					Internet	1374	712	37
ake up Product Improvements	ovements		-	В	0	Raw Material Units Used & Available	Used & Availa	ole					
R & D Expenditure (€ 100)	(in)		R	15	PZ	Opening Stock Available	lable		3 724	Sold to:			
						Bought Spot Last Quarter	Juarter		8 000) 	640	8	2
Purchasing		Ź		3-months hence 6-months hence	-months hence	Bought Default Last Quarter	t Guarter		0	Naffa	920	270	114
Kaw Materials Ordered (UUU)	dered (uuu)		О			Lost/Destroyed			200	Internet	001	000	D
		Ľ	otal Mimbar	Support		Closing Stock Lest Duester	Oriottor		5 100	Order Backlon			
			Wanted for	Payments	*	For Delivery Next Quarter	arter		3	E()	127	43	2
Agents and Distributors	go.	ž	Next Quarter	(€ 000)	Commission	Bought Last Quarter	rter		0	Nafta	193	101	522
EU Agents	nts		-	10	10	Bought Quarter before Last	efore Last		0				
Nafta Di	Nafta Distributors		-	0	0	For Delivery Quarter after Next	after Next			Warehouse Stocks			
Internet	Internet Distributor		XXXXX	12	-	Bought Last Quarter	rter		0	A :	0	0	
Junetine Marchines		c	Misselfer	0.11	t,	2		Г	0.000	Nama	0	0	
Machines to buy	10 DUY	0 0	Note and December	Number of Ports Operated	9 6	Demograph of Start of Local Constitution	ranagement	Amen Dr.	Remitte A1			0	
Maintenance Hours nor Machine	Machina	9 6	men-sic pevelopiieii (* 000)	opulati (* opo)	77	Decruited during 1 act Ouster	of Orienter	77	1	Droduct			
Assembly Hourly Wage Bate (E.c.)	Rate (€ c)	10.0		Shiff Level	2	Trained from Unemployed	ploved	0	0	Improvements	NONE	MINOR	MINOR
Assembly Workers Hired (+) / Fired	d (+) / Fired (-)	0	Assemb	Assembly Workers Trained	0	Dismissed		0	0				
						Quit at end of Last Quarter	Quarter	0	2	Serviced under			
Investments (+/- € '000)		0	Term	Term Loans (€ '000)	0	Available for Next Quarter	Juarter	22	41	Guarantee	26	S	29
Management Budget (€ '000)	(€ ,000)	120		% Dividend Paid	m								
nformation on Corporate Activity	ate Activity	-	Information	Information on Market Shares		Agents & Distributors	En en	Nafta	Internet	Internet Service			
nsurance Plan Number	er	-				Available Last Quarter			1	Complaints	164	92	31
						Quit Last Quarter	0	0	0				
Information Technology Report for Last Quarter	gy Report for Last	Quarter				Dismissed Last Otr.			0	Transport	2	Nafta	Internet
Number of Internet Communications Ports Operated	nmunications Ports	: Operated		ro.		Recruited for Next Otr			0	Average Journey(km)	1 594	200	300
Number of Internet Visits carried through successfully	its carried through s	nssecons	Į,	22 100		Available for Next Otr	-	-	-	No. of Loads	4	4	
% of Potential Internet Visits that failed to connect	Visits that failed to	connect		2,6									

Figure A.9: Historical Management Report W011053 a

	~ <u>~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ </u>	To value of		, dy		Cash Flow Statement Trading Receipts Control Descripts	1 565 061
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1,176	Value Ses Ses Ses Ses Ses Ses Ses Ses Ses Se		ψķ		Trading Receipts	1 565 061
Commany Section Commany Se	~ (E)	Value S Sold Costs Cocks C		of Property		Conital Descripto	
Matter Parcel Valve 19 19 19 19 19 19 19 1	1,176	. 5				Capital Medeldis	0
According to the Control of Con	~ (2) n	9				Interest Received	0
March Marc	1176			Total Fixed Assets	1 856 596	Irwestments Sold	0
Marche March Ma	2 1,175 1,176 1,39	Pee Stock Value Stock Value See See See See See See See See See S	200	Value of Product Stock	0	Insurance Receipts	39 189
	1,176	SS Slock Value		Value of Haw Material Stock	2/00/2/15	Additional Loans	
Control Cases Control Case	1,175 1,175 1,175 1,3	SS STOCK Value		Cash	691734	Trading Payments	1 469 972
	1176	pa- pa- sphia	_	Investments	0	Capital Payments	0
	11.75 11.75 1.176 1.39	reipts		Total Assets	3 424 193	Interest Paid	18 053
	1,175	eeipts				Imestments Bought	0
	11/75 11/75 11/75	eipts eed		Liabilities		Tax Paid	0
	11/12 3 11/17 3 11/17	eipte		Tax Assessed & Due	0	Dividends Paid	000 09
	1,176 1,176 1,176 1,176	Day		Creditors	366 568	Loans Repaid	0
1 Control	1.176 1.176 1.176 3			Bank Overdraff		May Over Bless	200 02
1	2 3 1,175 1,175			Total Cureat Loans	0.25 356	INGLOSSII FION	00 770
1 1 1 1 1 1 1 1 1 1	2 3 1,175 1,175			Not Accets	300 300	Character I from Most Contract Of	ł
1,175 1,17	2 3 1,175 1,175			Term loans	601777	Borrouing Dougs Next Orester	107 000
1. Max Particular 1. Max Particular 1. Max Particular 1. Max Particular 1. Max Particular 1. 1. Max Particular 1. 1. Max Particular 1. 1. 1. 1. 1. 1. 1. 1	2 1,175 3 3			Net Worth	2 455 863		
1,175	2 3 1,175 1,175			Share Capital	2000000	Raw Material Prices (US\$ per	000 units)
Transferred to Reservees 4 16	2 3 1,175 1,175			Reserves	455 863	Spot Price 3-Mc	nth 6-Month
1,175 1,17	2 3 4 1,175 1,175 1,175 3 1,35			Shareholders Funds	2 455 863		
1 1 1 1 1 1 1 1 1 1	1,175 1,175 1,176			% of Market Share by Products So	ld - Paid for Information	NOT REQUESTED	
1, 175 1,1	1,176 1,175 1,176 1,176 3 3 3 3	40		Company			
1		1,175					
1	ESS INTELLIGENCE	m					
1.00 1.00	ESS INTELLIGENCE			Internet			
1 2 2 2 2 2 2 2 2 2							
1				Nafta			
National Colore 1,200 2,500 2,	1 2 3 4	9					
Mathematical Math	275 275 275 275	275					
1,000, 1	270 270 270 270	270		Nafta			
ALL COMPANY DALANCE SHEETS ALL COMPANY DALANCE SHEETS Company Dalance Comp	s (e) 270 270 270 270	270		Internet			
15 15 15 15 15 15 15 15	440 440 440 440	440					
15 15 15 15 15 15 15 15	435 435 435 435	435		ALL COMPANY BALANCE SHEETS			
March Outsteel Marc	(e) 435 435 435 435	435		Company Number			
19 19 19 19 19 19 19 19	999 999 999	999		Assets		NOT AVAILABLE T	HIS QUARTER
1	199 199 199	999		Value of Property			
1	000 000 000 000 (a) a	000		Value of Machines			
1	20 00 00 00 00 00 00 00 00 00 00 00 00 0	2 5		Value of Product Stock			
2 2 2 2 2 2 2 2 2 2	מעטר שנטר שנטר שעטר	0,00		Value of Haw Material Stock			
1 2 2 3 4 5 6 6 6 6 6 6 6 6 6	2 2 2 2	7		Debtors			
1 2 2 2 2 2 2 2 2 2	ver Arthrite Daid for Information			Cast			
72 000 7	0 0	u		Lishilitiae			
Section Sect	vertising Spand (€) 72 000 72 000 72 000	2000		Tax Assessed & Due			
In the control of t	55 nn 55 nn 55 nn 55 nn	2000		Creditors			
Characteristic Char				Bank Overdraft			
Teach Control Teach Contro	1	1		Unsecured Loans			
Term Load Term	*	*		Net Assets			
New York New York	:	1		Term Loans			
Description Part Description Descrip	****	****		Net Worth			
to Duratif (deseasonalised) EU NAFTA Near of Owelshord World Reserved Preserved Countif (deseasonalised) 2,20 3,40 3,20 3,40 BUSINESS As Countif (deseasonalised) 2,20 3,40 3,20 BUSINESS BUSINESS As Countif (deseasonalised) 3,10 3,20 BUSINESS BUSINESS BUSINESS As San (deseasonalised) 1,20 3,20 BUSINESS BUSINESS BUSINESS Pols 61,00 28,00 BUSINESS BUSINESS BUSINESS				Share Capital			
All All	2		World	Reserves			
Perpendination 2,00 3,340 BUSINESS 2,948 BUSINESS 2,948 3,00 3,00 61,00 25,00 61,00 25,00	4801	27		Shareholders Funds			
test Ounter 5/316 - 5/345 003HESS 003H	seasonailsed) 2,20	0,40		THOUSE DEDOUT			
1,20 61,00 28,00	Jext Quarter 3 10	330		Mall street is expecting for	other increases in the value		
50,00 61,00 28,00	130			of the dollar Traders conti-	nie to helieve that the dollar		
	20009			will strengthen further again	inst European countries.		

Figure A.10: Historical Management Report W011053 b

A.2 Management reports

$A.2.1 \quad Quarter~IV~'05~Report~(W232054)$

Strong S	Łukasz Kalinowski				i I					Š.	GMC Poland 2006	1 2006		
PLEASE CRECK THE PECISIONS GIVEN BELOW Product 3 Machines Available for last Ounter for last 1	kontrolerzy				Company	Identity		2005	Quarter	4	ROUND I			
PLEASE CHECK THE DECISIONS GIVEN BELOW ANAILABILITY & LUSE OF RESOURCES Contained by the contained by											REPORT AF	TER FIRST [DECISION	
PLEASE CHECK THE DECISIONS GIVEN BELLOUM AVAILABILITY & LISTS OF RESOURCES Consmitting														
Product Prod	PLEASE CI	HECK THE DE	CISIONS GIVE	N BELOW		AVAILABILITY	A USE OF RES	OURCES		Ъ	RODUCT MO	VEMENTS &	AVAILABIL	T.
Carporate Insight Carp	antities of Product to		Product 1	Product 2	Product 3	Machines Available L	ast Quarter		9			1	Product 2	Product 3
Accordance 125			* 886	* 476 *	306	Machines Available fu	or Next Quarter		9	Quantities	:s			
Total Number of Part		utors	270 *	* 85	45					Schedule	pe.	2 7 2 9	1 355	757
Total Hours Supplement Total Hours Worked Last Outster 12 035 Shipped Last Outster Total Hours Worked Last Outster 12 035 Shipped Last Outster 12 035 Shipped Last Outster 13 075 Total Hours Worked Last Outster 13 075 Total Hours Panerage Machine Efficiency % March Outster 13 075 Total Hours Worked Last Outster 13 075 Total Hours Worked Last Outster 14 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Worked Last Outster 15 075 Total Hours Wo		ributor	1471 *	744 *	406	Assembly Workers	Hours			Produced	70	2 587	1 285	718
19						Total Hours Availab	le Last Quarter		12 936	Rejected		88	45	32
Corporate Image 276 420 666 Notice Hours 12 003 Shipped to: 12 003 Shipped to: 12 003 Shipped to: 13 0 Shipp						Hours Absenteeism	VSickness		139	Lost/Des	troved	0	47	0
Corporate Integer 270			275	440	999	Total Hours Worked	d Last Quarter		12 003			Ī		
Corporate Image Direct Product Abentism			328	572	986	Notice of Strike Wee	eks Next Quarter		0	Shipped 1	to:			
Corporate Image Direct Product Advertising Total House Varietie Last Quarter 6 552 Interest Distributors 247	Internet		270	435	099					EU Agen	ıts	904	419	280
Comprosite inage Direct Product Advertising Total Hours Paintelle Last Quarter 6 6 6 4 6 5 2 2 Hours Planted Briefactory 6 6 6 6 4 6 5 2 Hours Planted Briefactory 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6						Machine Hours				Nafta Dis	stributors	247	118	41
Fig. 6 6 6 6 6 6 6 6 6 6		orporate Image		ect Product Advertig	sing	Total Hours Availabl	le Last Quarter		6 552	Internet C	Distributor	1 347	999	37.
10 10 10 10 10 10 10 10		9	9	9		Hours Breakdown			84					
Fig. 10 Fig.	Nafta	۵	4	m	2	Hours Planned Mair	ntenance		108	Orders fro	:mc			
Next Quarter 100 1	Internet	9	9	9	9	Total Hours Worked	d Last Quarter		6 465	3		842	452	238
Next Countries 100 150						Average Machine E	fficiency %		87	Nafta		423	224	12
Next Cuarter 15 15 15 15 15 15 15 1	embly Times (minutes)		110	160	320					Internet		1570	821	413
Mont Ownter Smooths hence From this hence	e up Product Improvements		0	0	0	Raw Material Units	: Used & Availak	ale						
Next Ountier Smorths hence Bought Spot Last Ounter 0 Nath Bought Last Ounter 0 Nath	D Expenditure (€ '000)		15	15	15	Opening Stock Avai	ilable		5 100	Sold to:				
Next Outlier Next Outlier Shoutht hence Prounth hence Prough Default Last Outlier 2477	8					Bought Spot Last G	Juarter		8 000	<u>a</u>		904	419	280
Total Number Support Control Support Con	chasing			4-months hence 6-r	months hence	Bought Default Last	t Quarter		0	Nafta		247	118	4
Total Number Support Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Commission Closides y Nature Fig. 19 Closides y Nature Fig.	Raw Materials Ordered ('000)		00	00	6	Lost/Destroyed			0	Internet		1 347	999	37
Variety of the Book of the B						Used Last Quarter			/ 311			1		
Next Clarifier Fig. 2019 Section Fig			otal Number	Support		Closing Stock Last	Quarter		5 /88	Order Bac	klog			
Next Outster (© 000) Commission Bought Last Outster 8 000 Nata 119 119			Wanted for	Payments	»«	For Delivery Next Qu	larter	İ		2		37	8	n i
1 12 10 10 For Debught Outster after the Total Country 1 12 10 10 For Debught Outster after the Total Country 12 11 12 10 For Debught Outster after the Total Country 12 11 12 11 12 11 12 13 14 14 14 14 14 14 14	nts and Distributors	4	lext Quarter		Commission	Bought Last Quar	rter		8 800	Nafta		119	8	Z,
Number of Ports Operated 10 10 10 10 10 10 10 1	EU Agents			12	9	Bought Quarter b	efore Last		0					
Number of Potes Operated Compared Sast Outstare South Co	Nafta Distributors			2 5	2 ;	For Delivery Quarter.	after Next		0000	Warehou	se Stocks	c	c	
Number of Ports Operated 6 Numan Resource Management names monte of Ports Operated 6 Numan Resource Management names n	Internet Distributor		XXXXX	71		Bought Last Gua.	Ter		2000	0 4		0	0	
10 Wester Development (10 b) Product P	Machine Machines to Day		Missehor	of Dorto Opportunity	G	Human Document	tuomonenel	Т	- Control of Control	Malia		0 0	0 0	0
10 Secretaria 10 Secre	Machines to Coll	- c	Month of Dougle	or rolls Operated	9	Doronnol of Start o	of last Cuarter	2	A1	0		0	0	
10,5 Assembly Workers Trained 2 Trained from Unemployed 0 0 0 0 0 0 0 0 0	Manage Hours per Machine	8	100000000000000000000000000000000000000	donners (como)	2	Pacriited during 1	of Distor	ı u	7					
S Assembly Workers Trained D Dismissed Dismi	embly Hourly Wade Bate (# c)	10.5		Shift I pool	0	Trained from Unemp	nloved	0 0			aments	MONE	MINOR	MINOR
10 Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (6 100) Term Loans (9 100) Term Loans (9 10) Term Loans	embly Workers Hired (+) / Fired (-		Assembly	y Workers Trained	0	Dismissed		0	0					
120 Term. Lones (e Wolt) 120 Available for Next Ounder 27 46 Guarantee 96						Quit at end of Last	Quarter	0	Ŋ		under			
Total % Division of Market Shires Agents & Distributors EU Nation Information on Market Shires Total Information on Market Shires nts (+/- € '000)</td> <td>0</td> <td>Term</td> <td>Loans (€ '000)</td> <td>0</td> <td>Available for Next G</td> <td>Juarter</td> <td>27</td> <td>46</td> <td></td> <td>ntee</td> <td>96</td> <td>202</td> <td>38</td>	stments (+/- € '000)	0	Term	Loans (€ '000)	0	Available for Next G	Juarter	27	46		ntee	96	202	38
Hydry 1 Information on Market Shares 1 Agences Destructuations EU Nofite Information Info	nagement Budget (€ 1000)	120		% Dividend Paid	0									
Available Last Quarter 1 1 Complaints 172	rmation on Corporate Activity	-	Information	on Market Shares	-	Agents & Distributors	-		Internet	Internet S	service			
Outclassed Last On. University U U U Transport EU Nat	ırance Plan Number	-				Available Last Quarte				Comp.	aints	172	102	33
Disnissed Lead On. On On On On On On On On On On On On On						Quit Last Quarter			5					
Factualed for Next Otr 1 1 No. of Loads 6	irmation Technology Report for	r Last Quarter				Dismissed Last Otr.			0	Transpor		8	Nafta	Internet
21 956 Available for Next Otr. 1 1 1 No. of Loads	mber of Internet Communications	Ports Operate	9	ဖ		Recruited for Next On			0	Average JC	orrney(km)	1 594	900	300
	mber of Internet Visits carried thn	ongh successfu	JII.	21 956		Available for Next Oth	-	-	=	No. of Lo	ads	ی	2	o
	of Potential Internet Visits that fail	ed to connect		60										

Figure A.11: Historical Management Report W232054 a

Accounts (Euros)															
Overheads	000 000		Profit & Loss	Loss		2002	Balance Sheet						Cash Flow Statemen	nent	1 100 100
Advertising Internet Diethydion Agent	110 401		Sales Ke	enue	1/1	1/2 5//	Assets Value of Departs	2	260 000				Irading Receipts		1/32/24
Internet Service Provider	31835		Onenino	Onening Stock Value	300	1275	Value of Machines	nes	1 741 432		l		Interest Received		0
Selling Agents & Distributors	100 001		Material	Materials Purchased	1 100	1947	Total Fixed Assets	ets		1 991 432	l		Investments Sold		0
Sales Office	20 291		Assemt	Assembly Wages	146	5 341	Value of Product Stock	ct Stock		0			Insurance Receipts	ts	40 731
Guarantee Servicing	39.285		Machinis	Machinists Wages	8	284 168	Value of Raw Material Stock	Aaterial Stock		909 834	Ī		Additional Loans		0
Shipping & Hired Iransport	40.020	1	Machin	Macnine Running Costs	10.	1927	Deptors			656 141					4 000 000
Wab-Site Dauglonment	2000		Minus Choing S	Minus Closina Stock Value	000	00000	Insectment			800	Ī		Canital Payments		175 000
Personnel Department	17 000		Cost of Sales	ales	8	931 458	Total Assets			3 868 557			Interest Paid		18 053
Machine Maintenance	16 320												Investments Bought	aht	0
Warehousing & Purchasing	21 110		Gross Pr	Gross Profit/Loss	78	783 819	Liabilities						Tax Paid		0
Business Intelligence	12 500						Tax Assessed & Due	& Due		117 276			Dividends Paid		0
Credit Control	4 384		Insurant	Insurance Receipts	#	40 731	Creditors			755 238			Loans Repaid		0
Insurance	12 341		Interest	Interest Received		0	Bank Overdraft			0 1			-		
Management Budget	000021		Interest Paid	Paid		2000	Unsecured Loans	us		0	Ī	_	Net Cash Flow		-362 564
Other Miscellaneous Costs	32.125		Overneads	Spi		/10 649 40 464	Not Acces	Dilities		2 000 042			Contraction Social States	d Outsides (6)	300 000
		-	Tay Account	poccod	1	2 226	Term loans			EU1 777			Borrowing Power Next Quarter (F)	lovt Guarter (6)	436 000
Taxable Profit/Loss Accumulated	390 920						Net Worth			2 394 271				(1)	
			Net Profit/Loss	ALoss	ڼ	-61 592	Share Capital			2 000 000			Raw Material Prices (US\$ per 000 units)	s (US\$ per 1000	nuits)
Insurance Claimed	42 787		Dividends Paid	ds Paid		0	Reserves			394 271			Spot Price	ice 3-Month	×
Insurance Excess	2 066		Transfern	Transferred to Reserves	φ	1 592	Shareholders Funds	spun		2 394 271	Ī		37 008		38 380
ALL-COMPANY SHARE PRICES & DIVIDENDS	DIVIDENDS						% of Market Sh	% of Market Share by Products Sold - Paid for Information	Sold - Paid	for Informat	uo				
Company Mumbos					ŀ		Company			c		*			
Share Price (# c)	1303 1337		1 280 1 294		ŀ		Product 1:	ā	39	209	9 60	30			
% Dividend Paid								Nafta	4	2.0	99	4.4			
							_	ernet	13.2	13.2	86	12.2			
BUSINESS INTELLIGENCE							Product 2:	EU	3,8	4,6	3,6	3,9			
'ree Information on Companies' Activity								Nafta	4,0	1,9	9,0	4,8			
Company Number							드	Internet	10,9	12,5	12,6	12,1			
Product 1: EU Price (€)					-		Product 3:	En	3,7	0,0	60	M 6			
Internet Price (#)							3	Nama	0,00	0,1	6,00	0,00			
Deaduct 3: Ell Drice (6)								10110	0.01	2	2	0,01			
Nafia Price (F)							ALL COMPANY	ALL COMPANY BALANCE SHEETS	FTS						
Internet Price (E)							Company Number	e.	1	2	m	4			
Product 3: EU Price (6)	999 999		029 299				Assets								
Nafta Price (€)							Value of Property	rty	250 000	250 000	250 000	250 000			
Internet Price (E)							Value of Machines	nes	1 566 432	1 741 432		1 566 432			
lotal Number Employed							Value of Product Stock	ct Stock	100 110	VC0 000	254 430	470.490			
Assembly wage kate (E.c.)							Value of Raw in	Naterial Stock	422 119	909 934	000 000	731 305			
							Cash		650 236	309 150	166 892	769 138			
Business Activity - Paid for Information	nation						Investments		1 000						
Sompany	-						Liabilities								
Total Advertising Spend (€)	73 000 63 000	00 22 000	000 22 000	0			Tax Assessed & Due	& Due	115 077	117 276	98 786	114 903			
Research Spend (E)							Creditors		451 353	755 238	443 082	329 979			
Consumer Star Katings		1					Bank Overdraff					Ì			
Product 1	•	,			ļ		Mot Access	2	0.000.010	CN0 300 C CN0 000 C	200 220 0	0020000	1		
Designed 2					+		Tomo Jones		010 000 7	2 220 042	007 000 7	500 000			
Moh cito Stor Doting			2000 2000	0 0			Not Month		2 300 141	2 304 271	2 3 5 5 4 C C	7 300 737			
8				,	ļ		Share Capital		2 000 000	2 000 000	2 000 000	2 000 000			
CONOMIC INTELLIGENCE		B			at of Devel	oped World	Reserves		389 141	394 271	353 464	388 737			
Gross Domestic Product Last Quarter (deseasonalised)	arter (deseasonalised		104		2	27.334	Shareholders Funds	spun-	2 389 141	2 394 271	2 353 464	2 388 737			
% Unemployment Rate Last Quarter (deseasonalised)	er (deseasonalised)		R	3,20											
Balance of External Trade Last Quarter	larter	25	2 918	-2 948			BUSINESS REPORT	ORT							
% Annual Central Bank Base Rate for Next Quarter	tor Next Quarter		2,5	3,20	-		Cove	Governments around the world are still poorly prepared	he world are	till poorly pre	pared				
Exchange Rate of 1 USD quoted in Euros, Next Quarter	n Euros, Next Guart.		77.8	04.00	ľ	00 00	TO pre	to prevent a pird flu pandemic from causing severe	ndemic from c	ausing sever	-				
io Access of Population to Pos		В	3	90'10	1	00,02	eculi	economic disruption. The international worterary number claims that an outbroad could wine as much as picht	ing memano	at much ac	und				
								TO THIS OF THE PARTY OF	adian pipos si	OF HORSE	All In				
							berce	percent off Gross Domestic Product	nestic Product		×				

Figure A.12: Historical Management Report W232054 b

A.2.2 Quarter I '06 Report (W232061)

Łukasz Kalinowski	inowski								GMC Poland 2006	nd 2006		
kontrolerzy			Group 2	23 Company	2 Identity 0	Year	2006	Quarter 1	ROUNDI			
									REPORT A	REPORT AFTER SECOND DECISION	UD DECISIO	z
	PLEASE CHECK THE DECISIONS GIVEN BELOW	E DECISIONS	GIVEN BELOW		AVAILABILIT	AVAILABILITY & USE OF RESOURCES	OURCES		PRODUCT MC	PRODUCT MOVEMENTS & AVAILABILITY	AVAILABII	,III
Quantities of Product to	2	Product	1 Product 2	Product 3	Machines Available Last Quarter	Last Quarter		9		Product 1	Product 2	Product 3
make and ship to:	EU Agents	7.7		208	Machines Available for Next Quarter	for Next Quarter		7	Quantities:			
Wot delivered in	Naffa Distrbutors	6	*	161					Scheduled	2 110	1 407	724
full if starred)	Internet Distributor	38		355	Assembly Workers Hours	Hours			Produced	2 127	1 418	732
					Total Hours Available Last Quarter	ole Last Quarter		15 876	Rejected	99	37	21
					Hours Absenteeism/Sickness	n/Sickness		384	Lost/Destroyed	0	88	6
Prices (€):	B	38		669	Total Hours Worked Last Quarter	d Last Quarter		15 522				
	Nafta	ř	319 509	692	Notice of Strike Weeks Next Quarter	eks Next Quarter		0	Shipped to:			
	Internet	×		669					EU Agents	730	384	178
					Machine Hours				Nafta Distributors	491	246	136
Advertising (€ '000)	Corporate Image	mage	Direct Product Advertising	tising	Total Hours Available Last Quarter	ole Last Quarter		6 552	Internet Distributor	158	999	306
EG		9	8	9	Hours Breakdown			117 1				
Nafta		4	5	6	Hours Planned Maintenance	intenance		75	Orders from:			
Internet		9	00	9	Total Hours Worked Last Quarter	d Last Quarter		6 185	2	698	188	187
					Average Machine Efficiency %	Efficiency %		87	Nafta	8	98	14
Assembly Times (minutes)	ntes)	*	150 225	400					Internet	1018	642	326
Take up Product Improvements	rovements			0	Raw Material Units Used & Available	s Used & Availak	ale					
R & D Expenditure (€ '000)	1000			10	Opening Stock Available	ailable		13 789	Sold to:			1
					Bought Spot Last Quarter	- Guarrer	Ì	0	2 2	000	48.0	2 5
Purchasing	1,000	Next Unarter	ter 3-months hence b-months hence	-months hence	Bought Default Last Quarter	st Guarter		0	Natta	100	240	200
Kaw materials U.	raerea (uuu)				LosvDestroyed			7 150	Internet	Ē	247	Ř
		Total Number	Sunnort		Closing Stock Last Duarter	Onortor		8630	Order Backlon			
		Wanted for		×	For Delivery Next Quarter	larter		3	Cine Darwing	c	-	
Agents and Distributors	2	Next Quarter	Ė	Commission	Bought Last Quarter	nter		c	Nafta	ç	ú	27
EU Agents	unts			10	Bought Quarter before Last	pefore Last		0006				
Nafta D	Naffa Distributors		- 0	10	For Delivery Quarter after Next	after Next			Warehouse Stocks			
Internet	Internet Distributor	XXXXX		E	Bought Last Quarter	ırter		2 000	EU	45	0	0
									Nafta	0	0	
Production Machines to Buy			Number of Ports Operated	9	Human Resource Management	Management	Arendy M	Machinita	Internet	0	14	
Machines to Sell		0 Web-ste	Web-ste Development (€ '000)	Я	Personnel at Start of Last Quarter	of Last Quarter	27	46				
Maintenance Hours per Machine		32			Recruited during Last Quarter	ast Quarter	m	2	Product			
Assembly Hourly Wage Rate (€.c)		10,5	Shift Level	2	Trained from Unemployed	ployed	0	0	Improvements	NONE	MINOR	MINOR
Assembly Workers Hired (+) / Fired (-)			Assembly Workers Trained	0.00	Dismissed		0	0				
				•	Ourt at end of Last Quarter	Quarter	9	,	Serviced under	007		
Investments (+/- € 100)		5	Term Loans (€ 1000)		Available for Next Quarter	Juarter	8	14	Guarantee	3	244	78
Management Budget (€ 100)		4	% Dividend Paid	m		+	+					
nformation on Corporate Activity	rate Activity	U Inform	Information on Market Shares		Agents & Distributors	s EU	Natta	Internet	Internet Service			
nsurance Plan Number	Jet				Available Last Quarter Quit Last Quarter			- 0	Complaints	8	8	37
rmation Technolo	nformation Technology Report for Last Quarter	arter			Dismissed Last Otr.	0	0	0	Transport	EO	Nafta	Internet
nber of Internet Co	Number of Internet Communications Ports Operated	erated	9		Recruited for Next Otr	520		0	Average Journey(km)	1 594	900	300
mber of Internet Vis	Number of Internet Visits carried through successfully	ylluly	21 995		Available for Next Otr.			-	No. of Loads	ιΩ	4	
f Potential Internet	% of Potential Internet Visits that failed to connect	nect	60									

Figure A.13: Historical Management Report W232061 a

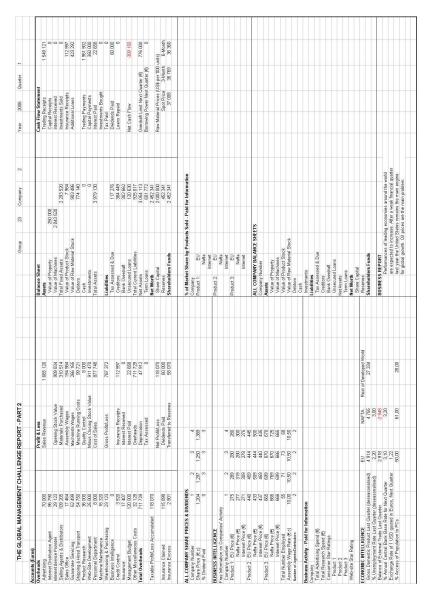


Figure A.14: Historical Management Report W232061 b

A.2.3 Quarter II '06 Report (W232062)

SC OFFICE YIELD CENTRAL CONTROL CONT	Łukasz Kalinowski	nowski			1						GMC Poland 2006	90		
Price Property P	Controlorace	The state of the s			Commany	Idontito			Oundor		NID I	3		
Price Circ Cric Cric Cric Cric Cric Cric Cric	5				Company	identity.			e composition of the composition					
Processor Product Pr										REF	PORT AFTE	R THIRD C	ECISION	
U. Agents Product 1 381 Product 1 381 Product 2 402 1 431 1.0.1 1.0.2 3.0.2 3.0.2 3.0.2 1.0.2		PLEASE CHECK THE I	DECISIONS GIV	ÆN BELOW		AVAILABILITY	' & USE OF RES	OURCES		PRODL	JCT MOVE	MENTS &,	AVAILABIL	₹
Composite to Comp	antities of Product t	0	Product 1	Product 2	Product 3	Machines Available L	.ast Quarter		7		Pro	duct 1 F	roduct 2	Product 3
State Stat	sake and ship to:	EU Agents	999	374 *	205	Machines Available for	or Next Quarter		00	Quantities:			1	
Corporate Inspect 1079 E639 350 Absentible Valories beloated 17 E440 Producted 2 89 E33 Statembry Valories beloated 17 E440 Producted 17 E440 Shipperted 17	t delivered in	Nafta Distrbutors	299	* 898	183					Scheduled		2 402	1381	738
Part	if starred)	Internet Distributor	1079	* 699	350	Assembly Workers	Hours			Produced		2 490	1 444	392
Corporate Image 200						Total Hours Availab	le Last Quarter		17 640	Rejected		88	8	88
1						Hours Absenteeism	η/Sickness		366	Lost/Destroye.	0	0	8	0
Composite 1 1 1 1 1 1 1 1 1	Prices (€):	B	280	445	029	Total Hours Worked	d Last Quarter		12 499			F		
Corporate Image Corporate I		Nafta	388	572	985	Notice of Strike Wee	eks Next Quarter		0	Shipped to:				
Corporate Image Direct Product Advertising Machine Hours Reachine		Internet	275	435	999					EU Agents		999	399	205
Corporate Image Corporate I						Machine Hours				Nafta Distribut	ors	299	98	18
Second Profession Seco	rertising (€ '000)	Corporate Im-		irect Product Advertit	sing	Total Hours Availab	ile Last Quarter		7 644	Internet Distrik	utor	1 079	646	38
1	EU	9	3	9	9	Hours Breakdown			98					
Second Color Seco	Nafta	9		m	2	Hours Planned Mai	ntenance		139	Orders from:				
Total Number Total Number Formation South Last Outsteen Total Number Formation Total Number Formation Total Number Formation Total Number Formation Total Number Formation Total Number Formation Total Number Formation Formation Total Number Formation Formation Total Number Formation Formation Total Number Formation Format	Internet	9		9	٥	Total Hours Worker	d Last Quarter		289 9	品		777	88	22
Total Number Total Number Support Supp						Average Machine E	fficiency %		87	Nafta	1	457	233	127
1	embly Times (minu	(sa)	110	160	88					Internet		1415	9//	88
Mart Outstee Face	e up Product Impr	ovements	-	0	0	Raw Material Units	Used & Availat	ple						
Next Guarter Smorth's herice Bought's Soft Last Quarter District S	D Expenditure (€))00J	5	0	0	Opening Stock Ava	ilable		15 630	Sold to:				
Next Charlet Shrothis here Percentis here Debuilt best Charlet 1						Bought Spot Last 6	Juarter		0	E		98	999	92
Total Number Support Contract Contra	chasing	10000	Next Quarter		nonths hence	Bought Default Las	t Quarter		0 0	Natta		493	40	80
Total Number Support	Raw materials Un	nerea (uuu)			,	Lost/Destroyed			7 676	Internet	+	6/0	8	8
Montacle of the Payments Second of the Pay			Total Number	Sunnort		Cheing Stock Last	Ousrter		7 054	Order Backlon	1	t		
Next Obacter (# 500) Commission Comm			Wanted for	Daymonte	35	For Delivery Nevt Ou	arter		5	Guer Darvios	+	8	ā	-
South Louise	nts and Distributor		Next Quarter	(# DUU)	Commission	Bought Last Quan	rter	İ	_	Naffa		3 =	2 =	2 =
Number of Posts Operated 10 For Delivery Quarter after Next 10 For Delivery Quarter after Next 10 For Delivery Quarter after Next 10 For Delivery Quarter after Next 10 11 For Delivery Quarter after Next 10 11 11 12 13 13 14 14 15 14 14 15 14 14	EU Ager	s)	5	12	10	Bought Quarter b	efore Last		7 000		-			
Number of Ports Operated Continue Resource Management Number of Ports Operated Continue Resource Management Number of Ports Operated Continue Resource Management Number of Ports Operated Continue Resource Management Number of Ports Operated Continue Resource Management Continue Resource	Nafta Dis	stributors	-	0	10	For Delivery Quarter	after Next			Warehouse St	ocks			
Number of Ports Operated Experiment Resource Management Number of Ports Operated Experiment Resource Management Number of Ports Operated Experiment Resource Management Number of Ports Operated Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Experiment al Shift Level Operated Oper	Internet	Distributor	XXXXX	12	11	Bought Last Qua	rter		2 000	B		0	0	0
10 Web-site benderment of Common Market Shares 10 10 10 10 10 10 10 1										Nafta		174	96	4
10 Vea-site Development (10 month) 10 Vea-site De	duction Machines			r of Ports Operated	٩	Human Resource N	danagement		schiniste	Internet		0	0	
10 2 2 2 2 2 2 2 2 2	Machines			elopment (€ '000')	×	Personnel at Start	of Last Quarter	8	41					
105 Assembly Worker Trained 2 Trained from Unemployed 0 O Improvements Novie	ntenance Hours per i					Recruited during La	sst Quarter	0	15	Product	1			
Assembly Worker Trained Dutt at and of Late Ouater 0 0 8 Serviced under 248 47	embly Hourly Wage			Shiff Level	2	Trained from Unemy	ployed	0	0	Improvemen		ONE	MINOR	NONE
1	embly Workers Hire		1	bly Workers Trained	0	Dismissed		0	0 1		+			
10 Term.Common on Market Shares 10 Available to Tribott Quarter 11 Tribonation on Market Shares 11 Available to Darket Common on Market Shares 12 Available Last Countries 13 Available Last Countries 14 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Last Countries 15 Available Countries 15 Ava			ľ		•	Unit at end of Last	Quarter		00 9	Serviced unde	35			
12 Information on Market Sharper 1 Information on Market Sharper 1 Information on Market Sharper 1 Complaints 1 Complaints 1 Complaints 1 Complaints 1 Complaints 1 Complaints 1 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 Complaints 1 E86 E86 Complaints 1 E86 E86 Complaints 1 E86 Complaints 1 E86 E86 Complaints 1 E86 E86 Complaints 1 E86 E86 Complaints 1 E86 E86 Complaints 1 E86	stments (+/- ¢ 100)			m Loans (€ 100)	5	Available for Next C	Juarter	8	94	Guarantee		248	4/	ę
Market Shares Adelate & Continuores Market Shares Mark	agement Budget (4	% Dividend Paid	0		+	+						
Available Last Guarter 1 1 Complaints 171 686	rmation on Corpor	ate Activity	Information	n on Market Shares		Agents & Distributors		+	Internet	Internet Serviv	93			
d 6 Grantsed Last Otr. 0 0 0 Transport EU Nata Herbride for Next Otr. 1 1 1 No. of Loads 5 5 5	ırance Plan Numbu					Available Last Quarti Quit Last Quarter			- 0	Complaints		1/1	8	S.
d 6 Recruited for Next Ctr. 1 1 1 No of Loads 6 6 6 6	rmation Technolog	IV Report for Last Quan	ter			Dismissed Last Otr.			0	Transport		=	Nafta	Internet
22 138 Available for Next Ore: 1 1 1 No. of Loads 6	mber of Internet Con	munications Ports Opera	sted	9		Recruited for Next Qu			0	Average Journey	8	1 594	99	300
of Potential Inferment Visits that failed to commect 1	mber of Internet Visi	ts carried through succes	ssfully	22 138		Available for Next Ott.			-	No. of Loads		Ю	ŁΩ	00
	of Potential Internet \	/isits that failed to conner	ti	-								i		

Figure A.15: Historical Management Report W232062 a

Verheads Advertising Internet Distribution Agent Internet Distribution Agent Selling Agents & Distributions Scales Office														Ī
strbution Agent vice Provider aris & Distributors			rofit & Loce			Ralanco Shoot				L	Cach Flow	Cach Flow Statement		
ent	63 000	. 03	Sales Revenue	-	758 117	Assets					Trading Receipts	eceipts		700 193
butors	101 822					Value of Property	35	250 000			Capital Receipts	sceipts		0
	30 496		Opening Stock Value		911 470	Value of Machines	2 163			_	Interest Received	eceived		0
	10 360		Materials Purchased		310 514	Value of Desired Seeds		2413 US/	/0		Investments Sold	Its Sold		12 000
omicino	35 500		Assembly Wayes	l	77.000.000	Value of Day Material Group	Stock	000	2 8		Additional page	Additional Loans		100 047
sport	54 700		Machine Running Costs		107 527	Debtors material	2000	832 064	3 23		Dadinon	01807		1000
	36 000		Quality Control		8 000	Cash			0		Trading Payments	ayments		678 539
nent	25 000	2	Minus Closing Stock Value		931 526	Investments			0		Capital Payments	ayments		175 000
	15 000	٥	Cost of Sales		818 002	Total Assets		4 176 647	47		Interest Paid	aid	Ī	27.117
Macnine Walmenance	00000	C	Grose Brofit II ose	l	940 11E	oglilide				1	Tov Doid	Tay Doid		117 276
	12 500					Tax Assessed & Due			0		Dividends Paid	Paid		0
	4 201		Insurance Receipts		13 892	Creditors		379 283	883		Loans Repaid	paid		0
	19 229		Interest Received		0	Bank Overdraft		. 209	æ					
	120 000		Interest Paid		27 117	Unsecured Loans			0		Net Cash Flow	low		0
ous Costs	32 199 Dr. 24r		Overheads		736.315	Total Current Liabilities		386	22		4.7	9	9	000
oral Overneaus	010 00		Depreciation		00 400	Term Jeen		2 190.	9.5		Coerdrall	Trill Next Gua	mer (e)	200,000
Tovokio Brofeil oco Accumulatori	254 107		187 Masesseu	t		Not Worth		0020	7 6	_	BUILDANIIO	DOLLOWING POWER 1983, GOALER (5)	(c) marrier	2
	70.107	2	Nat Profit nes		136 112	Share Canifal		2000	3 8		Raw Mater	Baw Material Prices (USS ner 1001 units)	S ner TITI un	(9)
Insurance Claimed	17 (196		Dividends Paid			Reserves		588	22			Sant Price	3-Month	6-Month
Insurance Excess	3 204		Transferred to Reserves		136 112	Shareholders Funds		2 588 453	23			36 999	36 548	36 018
ALL-COMPANY SHARE PRICES & DIVIDENDS	VIDENDS					% of Market Share by Products Sold - Paid for Information	Products Sold	Paid for Info	rmation					
Commany Mirmbor						Company					,			
Share Price (#c)	1.264 1.386	1313	1343	l		Product 1: EU			4 1	43	3.7	l	İ	
% Dividend Paid			0								0			
						Internet					-			
BUSINESS INTELLIGENCE						Product 2: EU		4,3			4.			
'ree Information on Companies' Activity						Nafta					0,			
Company Number			4								Z.			
Product 1: EU Price (€)			58			Product 3: EU					2			
Natta Price (€)			8 8			Natta					n, i	Ì		
Internet Price (t)			nez .	1		Internet					ų			
Product 2: EU Price (E)			645			STORE SHEETS	or eurero							
Nama Price (E)			3 5	t		ALL COMPANT BALAN	CE SHEETS	,	c	c		İ	Ì	
Desduct 3: Ell Dring (6)			670	t		Accepte			4	1	,			Ì
Noths Price (F)	985	382	38.			Value of Property	20		250000	UUU SKUUU	9			
Internet Price (#)			929	ŀ		Value of Machines	301	1489088 2163057	. 0	ľ	2 99			
Total Number Employed			8			Value of Product Stock								
Assembly Wage Rate (€ c)			11,00			Value of Raw Material Stock			882486 444097		83			
Number of Agents/Distributors			2			Debtors	39		064 982066	o	*1			
8						Cash	100	1044641		70326	90			
Business Activity - Paid for Information	ion			1		Investments		00	200000	00				
Company			4			Liabilities								Ì
Total Advertising opend (5)	00000 00000	00000	0000	t		lax Assessed & Due	e	020		774000	9			
Total Research Sperie (5)			nnnco			Donel Ourstand	7		57,9203 44,0303		2			
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Product 3			ŧ			Term loans	20				22			
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						Share Capital	30	2000000 2000000	000 200000	000 2000000	00			
CONOMIC INTELLIGENCE		EU	NAFTA	Rest of Do	Rest of Developed World	Reserves	36			212 451936	96			
Gross Domestic Product Last Quarter (deseasonalised)	r (deseasonalised)	4 944	4 732		27 334	Shareholders Funds	280	2599599 2588453			98			
% Unemployment Rate Last Quarter (deseasonalised)	(deseasonalised)	2,50	3,00											
Balance of External Trade Last Quarter	er	2 831	-2 995			BUSINESS REPORT								
% Annual Central Bank Base Rate for Next Quarter	r Next Quarter	8	320	1		In the United	In the United States commodity prices are rising.	ity prices are r	sing.					
Exchange Rate of 1 USD quoted in Euros, Next Quarter	uros, Next Quarter	1,24		1		Profits and sh	Profits and share prices are providing surprises	roviding surpris	ies.					
% Access of Population to PCs		8006	00'09		28,00	The American	The American economy is moving ahead with consumer	ming ahead wit	h consumer					
						spending increasing	easing.							

Figure A.16: Historical Management Report W232062 b

A.2.4 Quarter III '06 Report (W232063)

HECK THE DECISION outs himself coporate image 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0 mpany 22 22 22 23 24 40 67 67 67 68 68 68 68 69 69 69 69 69 69 69 69 69 69 69 69 69	Identity 0 Vear MANIALABILITY & USE OF REE Machines Available for Next Counter Machines Available lest Counter Total Hours Available lest Counter Hours Available lest Counter Hours Available lest Counter Hours Available lest Counter Total Hours Available lest Counter Hours Available lest Counter Hours Passed White Filteriance Available lest Counter Total Hours Available lest Counter Hour Branch Marine Filteriance Available lest Counter Total Hours Available lest Counter Total Hours Available lest Counter Hour Branch Marine Filteriance Available lest Counter Available lest Counter Total Hours Available lest Counter Hour Branch Marine Filteriance Available lest Counter Available les les les les les les les les les l	å	B B B B B B B B B B B B B B B B B B B	ROUND I	ROUND I REPORT AFTER FOURTH DECISION	H DECISION	
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and Distributors and Distributor final fi	200 * 2200 200 * 2200 200 530 700 5440 100 100 100 100 100 100 100 100 100 100	÷ 4 0000 E	Assembly Workers Hours Total-Hours Available Last Ouester Hours Assembles mixed-ness Total-Hours Available Last Ouester Hours Assemble and Ouester Worker Last Ouester Machine Hours Available Last Ouester Hours Beackdown Hours Planned Maintenance Total-Hours Worked Last Ouester Hours Beackdown Total-Hours Worked Last Ouester Hours Beackdown Total-Hours Worked Last Ouester Machine Filtering Worked Last Ouester Assemble Mainten Filtering Worked Last Ouester Assemble Maintenance Assemble Maintenance Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester Assemble Maintenance Total-Hours Worked Last Ouester To	171 15 15 8	640 637 - 637 - 0 736 - 100 - 156 - 385	Quantities:			
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fits fits Corporate frins fits fits fits fits fits fits fits fit			Hours Absenteeism/Sickness Trial Hours Wriskel List Quarter Notice of Strike Weeks Next Quarter Machine Hours Total Hours Available Last Quarter Hours Breakdown Hours Planned Maintenance Total Hours Worked Last Quarter A	. 25 8	4937 0 0 100 1 156	Rejected	101	25	36
frate Corporate Inna 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		000	Total Hours Worked Last Oparter Matchine Hours Total House Available Last Quarter Total Hours Available Last Quarter Hours Breakforked Last Quarter Hours Planned Maintenance Total Hours Worked Last Quarter Awarasa Machine Fficiency %	₹ 8	0 0 100 H	Lost/Destroyed	5	0	0
emet Corporate Ima			Mactine Hours Machine Hours Total Hours Available Last Quarter Hours Breakdown Hours Pleaskdown Hours Pleaskdown Awardon Holland Guarter Awardon Maintenance Total Hours Worked Last Quarter Awardon Machine Fficiency %	80	0 0 239 100 - 156 385				
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ments		7 7 7 360	Hours Breakdown Hours Planned Maintenance Total Hours Worked Last Quarter Awerson Machine Efficiency %		5	Internet Distributor	1514	820	9
ments		10 7 360	Hours Planned Maintenance Total Hours Worked Last Quarter Awarage Machine Efficiency %		8 %				
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ments		98 - 1	Cyclothe consession of plant		88	Naffa	984	328	174
ments		- 1				Internet	1 397	902	88
			Raw Material Units Used & Available						
		9	Opening Stock Available	14	14 954	Sold to:			
			Bought Spot Last Quarter		0	2	8	362	218
	rter 3-months hence 6-months hence	nths hence	Bought Default Last Quarter		0	Nafta	989	328	13
Raw Materials Ordered ('000)	0	0	Lost/Destroyed		0	Internet	1387	708	88
			Used Last Quarter	00 1	2000				
lotal Number	Support		Closing Stock Last Quarter	0.	401	Order Backlog	ľ		
	Payments	»« .	For Delivery Next Quarter		,	A :	- ;	0	D
Agents and Distributors Next Quarter	(€ DDD)	Commission	Bought Last Quarter		0 1	Naffa	44	0	2
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memer distributor			Douget Last Guarter		5	- N	20	8 8	<u>+</u> C
	Number of Ports Operated	Œ	Himan Recourse Management	describit. Healthirds		Internet	117	5 5	e
- B	Web, she Development (#1000)	2 %	Personnel at Start of Last Quarter	S	100	10110111			5
32			Recruited during Last Quarter	0	91	Product			
-	Shift Level	2	Trained from Unemployed	0	0	Improvements	MINOR	MINOR	NONE
0 (9)	Assembly Workers Trained	0	Dismissed	0	0				
			Quit at end of Last Quarter	0	14	Serviced under			
0	Term Loans (€ 1000)	0	Available for Next Quarter	8	8	Guarantee	98	146	79
Management Budget (€ 1000) 120	% Dividend Paid	2							
e Activity 1	Information on Market Shares	-	Agents & Distributors EU	Nafta Internet	ıet	Internet Service			
nsurance Plan Number 1			Available Last Quarter 1	- 0	- 0	Complaints	184	92	46
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% of Potential internet Visits that falled to connect	D. D.							Ī	

Figure A.17: Historical Management Report W232063 a

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100 20 20 20 20 20 20 20	3398 718 Overdraff Limit Next Quarter (6)	er (6) 1 002 000
100 100		
10 10 10 10 10 10 10 10		
17.5 1.5	Raw Material Prices (US)	협
Columbia Columbia	Spot Price	3-Month 6-Month
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Figure A.18: Historical Management Report W232063 b

$A.2.5 \quad Quarter~IV~'06~Report~(W232064)$

Łukasz Kalinowski	inowski			1						GMC Poland 2006	G		
kontrolerzy			Group 23	Company	2 Identity 0	Year	2006	Quarter	4 ROUI	ROUND I			
							Ш		REP	REPORT AFTER FIFTH DECISION	FIFTH DE	CISION	
	PLEASE CHECK THE DECISIONS GIVEN BELOW	DECISIONS G	IVEN BELOW		AVAILABILITY	AVAILABILITY & USE OF RESOURCES	OURCES		PRODU	PRODUCT MOVEMENTS & AVAILABILITY	ENTS & A	VAILABIL	₹
Quantities of Product to	t e	Product 1	Product 2	Product 3	Machines Available Last Quarter	ast Quarter		8		Product	1	Product 2	Product 3
make and ship to:	EU Agents	335		257 *	Machines Available for Next Quarter	or Next Quarter		00	Quantities:				
Wot delivered in	Nafta Distributors	934 *		254 *					Scheduled	(1)	1 429	1 545	912
full if starred)	Internet Distributor	1560		401 *	Assembly Workers Hours	Hours			Produced	· co	3 432	1 546	912
					Total Hours Available Last Quarter	e Last Quarter		17 640	Rejected		117	83	8
					Hours Absenteeism/Sickness	/Sickness		099	Lost/Destroyed	700	0	0	0
Prices (€):	E	275		0/9	Total Hours Worked Last Quarter	Last Quarter		16 980			-		
	Nafta	320	230	900	Notice of Strike Weeks Next Quarter	ks Next Quarter		0	Shipped to:				
	Internet	270		999					EU Agents		903	413	248
					Machine Hours				Nafta Distributors	21C	903	398	24
Advertising (€ '000)	Corporate Image	nage	Direct Product Advertising	sing	Total Hours Available Last Quarter	e Last Quarter		8 736	Internet Distributor	utor	609	714	388
EŪ	3	38			Hours Breakdown			98					
Nafta		5	0	0	Hours Planned Maintenance	ntenance		170	Orders from:				
Internet				10	Total Hours Worked Last Quarter	Last Quarter		8 115	3		8811	209	33
					Average Machine Efficiency %	fficiency %		88	Nafta		1 110	999	287
Assembly Times (minutes)	ntes)	120		390					Internet	-	499	763	400
Take up Product Improvements	rovements	0	0	0	Raw Material Units Used & Available	Used & Availab	le						
R & D Expenditure (€ '100)	.000)	e		9	Opening Stock Available	lable		13 401	Sold to:				
9					Bought Spot Last Quarter	luarter		0	13		973	478	262
Purchasing		Next Quarter	3-months hence 6-months hence	months hence	Bought Default Last Quarter	Quarter		0	Nafta	3	88	414	24
Raw Materials Ordered ('000)	rdered ('000)	0	0	0	Lost/Destroyed			94	Internet		499	22	40
			1		Used Last Quarter			9 260					
		Total Number			Closing Stock Last Quarter	Quarter		4 047	Order Backlog				
		Wanted for	۵.	%	For Delivery Next Quarter	arter	İ		2		101	25	37
Agents and Distributors	2	Next Quarter	(€ 000)	Commission	Bought Last Quarter	ter		0	Naffa		22	R	m
EU Agents	uts	2	2	00 (Bought Quarter before Last	efore Last		0					
Natta	Natta Distributors	7	2 (20 2	For Delivery Quarter after Next	after Next		c	Warehouse Stocks	ocks		c	
Internet	Internet Distributor	XXXXX	7		Dought Last Guarter	Je L		>	0 4		5 0		
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Machines to buy		O North Office Colonia	Number of Postson	0 4	Demonstrate Management	if not Cuntor		Macminists AD	lallialli		17	3	7
Macmines to Jell		-	overplines (* coco)	2	Recruited during last Duarter	of Orienter	3 0	14	Product				
Accembly Hourly Wage Pate (# c)		į u	Shift I avail	c	Trained from Illiamployed	loved	0 0		mnrwamante	NONE	F	MONE	MONE
Assembly Workers Hired (+) / Fired (-)	ad (+) / Fired (-) 0	ľ	Assembly Workers Trained	0	Dismissed		0	0			F		
					Quit at end of Last Quarter	Quarter	0	14	Serviced under	2	F		
Investments (+/- € '000)		D Te	Term Loans (€ '000)	0	Available for Next Quarter	uarter	8	20	Guarantee		106	83	29
Management Budget (€ '000)		120	% Dividend Paid	0									
nformation on Corporate Activity	tivity		Information on Market Shares	-	Agents & Distributors	B	Nafta	Internet	Internet Service	بو			
nsurance Plan Number	er	-			Available Last Quarter		2		Complaints		200	8	43
					Quit Last Quarter	0	0	0					
rmation Technolc	Information Technology Report for Last Quarter	ırter			Dismissed Last Otr.	0	0	0	Transport	_		Nafta	Internet
mber of Internet Co	Number of Internet Communications Ports Operated	rated	۵		Recruited for Next Otr		0	0	Average Journey(km)		1 434	8	98
mber of Internet Vit	Number of Internet Visits carried through successfully	essfully	21 403		Available for Next Otr.		2	-	No. of Loads		۵	ယ	0
of Potential Internet	% of Potential Internet Visits that failed to connect	ect	60										

Figure A.19: Historical Management Report W232064 a

	Accounts (Euros)											İ				
Control Cont	heads			Profit & Lo.	88			Balance She	et				Cas	Flow Statemer	=	
Coloniary Colo	rtising	105 000		Sales Revei	une	23817	230	Assets					Tra	fing Receipts		2 072 831
Material Processing Control Material Processing Material Processing Control Material Pro	net Distribution Agent	122 928						Value of Pro	perty	250 000			Cap	ital Receipts		0
Continue Continue	et Service Provider	36.251		Opening S	Stock Value	621 :	282	Value of Ma	chines	2 056 258			Inte	rest Received		0
Making Demis Office of the Control of Cont	ig Agents & Distributors	177 427		Materials	Purchased		0	Total Fixed A	ssets		2 306 258		lme	stments Sold		0
Control Cont	s Office	27 100		Assembly	Wages	2111	390	Value of Pro	duct Stock		32 286		lus	rance Receipts		8
Control Character Cont	antee Semoing	77.760		Machinists	Wages Veges	340.	205	Value of Kar	w Material Stock		1704 606	İ	Ad	Itional Loans		0
Control Charles Control Ch	ing & miled Hallsport	0000		Ousline Co	offilling coars	28	000	Cach			706 670	l	T	line Doomonto		1 517 010
Control Colored State Colo	Site Davelopment	15.00		Minus Closi	no Stock Value	197.5	23.00	Inactmento			00000	l	ê	ital Poumanto		000
Table Tabl	annel Department	14 000		Cost of Sale	St.	1 107 0	316	Total Assets			4 025 355	İ	lnte	rest Paid		20 211
Contact PondeLoss Contact Pon	ine Maintenance	21 760											linvi	stments Bought		0
Fig. Fig.	housing & Purchasing	21 767		Gross Profit	Moss	1 274 2	274	Liabilities					Ta	Paid		0
Figure F	ess Intelligence	12 500						Tax Assess	ed & Due		259 840		MG Div	dends Paid		0
	Control	5 940		Insurance	Receipts	~	908	Creditors			263 177		õ	ns Repaid		239 778
	nce	17 884		Interest Re	eceived		0	Bank Overd	##		0					
	gement Budget	120 000		Interest Pa	pie	8	211	Unsecured I	oans.		0		Net	ash Flow		296 670
Fig. 2015 Fig.	Miscellaneous Costs	32 508		Overheads		838	715	Total Current	Liabilities		523 017					000 000
1	Verheads	038 / ID		Depreciati	uo	70	97/	Net Assets			3507338		ē 1	araff Limit Next C	uarter (E)	903 000
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Accordance Acc	Internet Price (fil								nternet	76		16.7	14.3			
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	ct 2: EU Price (€)															
	Nafta Price (€)							ALL COMPA	NY BALANCE SHEI	ETS						
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1	Internet Price (€)							Value of Ma	chines	1415566		1604354	17399671			
1	Number Employed							Value of Pro	duct Stock		32286	273323	98304			
2 4 2 2 2 2 2 2 2 2	nbly Wage Rate (E.c.)							Value of Rav	w Material Stock			158960	274724			
1	of Agents/Distributors							Debtors		661208		860276	990324			
1								Cash		1328119		207022	169218			
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Figure A.20: Historical Management Report W232064 b