

Value-based management in the ThyssenKrupp Group

July 2011



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Business management at ThyssenKrupp is based on the group-wide application of a value-based management system.

Elements of this system are:

- ThyssenKrupp Value Added (TKVA) as the key performance indicator for measuring value added after cost of capital
- Integration of value-based management in all management processes
- Use of value management for decision making at strategic and operating level

At ThyssenKrupp these elements support the process of concentrating on businesses which rank among the best in the world. The Group's businesses focus on high-grade industrial products and services tailored to customer requirements.

Controlling, July 2011

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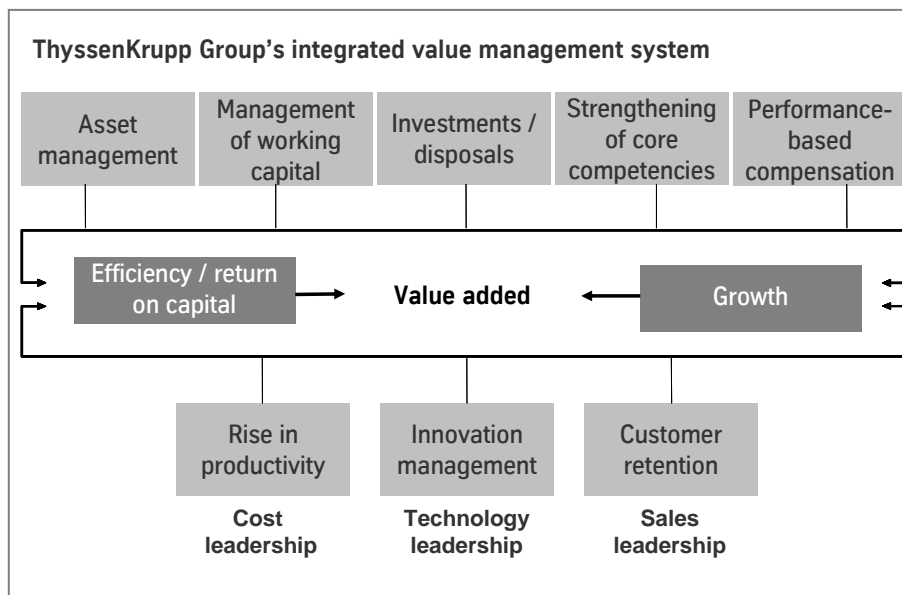
I Introduction to value management

Aims and importance of value management

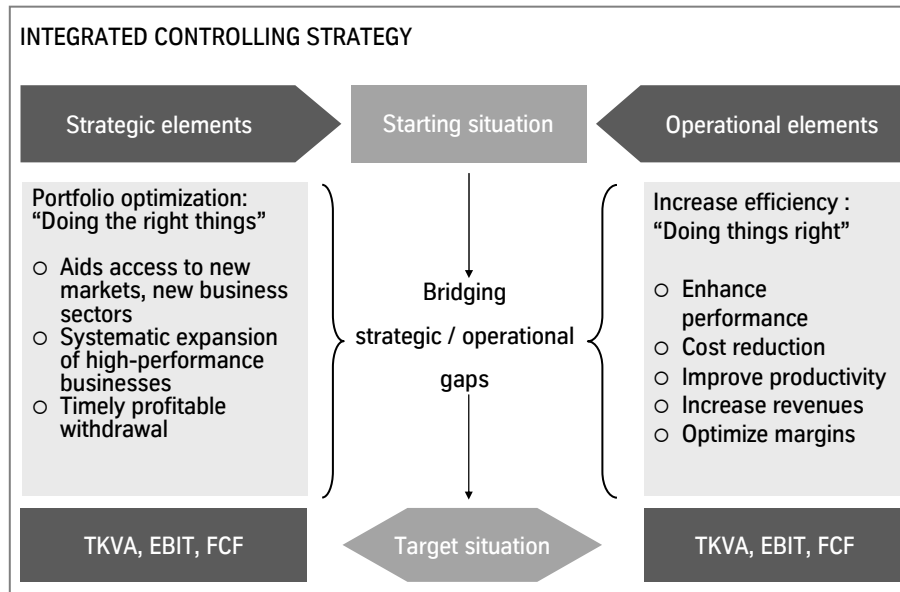
- The increasing competitive environment and internationalization of the capital markets, together with stricter requirements resulting from the corporate governance debate, have led to increased demands for transparent and structured corporate management and increased competition for capital.
- The objective of value-based corporate management is to identify and realize value potentials within the company in order to attract and retain long-term investors. These investors are shareholders, financial institutes, banks, institutional investors as well as employees with their pension entitlements.
- If a company achieves returns in excess of capital market expectations – and thus in excess of its cost of capital – it creates value. If this condition is met, investors will continue to make funds available to the Group on a long-term basis.
- Successful value management increases stockholder satisfaction and improves the way the company is judged by analysts, banks and rating agencies. It satisfies the interests of both customers (through innovative, market-oriented products and services) and suppliers (by securing liquidity and purchasing volumes). It motivates employees by providing challenging tasks and it safeguards jobs.
- Value management means focusing on systematically increasing the value of the company. It forms the basis for value-creating growth.

Value management in the ThyssenKrupp Group

- Due to the Group's high capital intensity, wide variety of business models, organizational structure and strong capital market focus, value management is particularly important for ThyssenKrupp.
- The aim of value management in the ThyssenKrupp Group is to systematically increase value through the efficient use of resources and profitable growth.
- To this end, value-based targets are defined for the ThyssenKrupp Group and the Business Areas. We expect our businesses not just to cover their cost of capital but to add value to the Group.



- Value-based management is part of an integrated controlling strategy in the ThyssenKrupp Group.
- The task of controlling is to identify gaps between the actual situation and the set targets thus to highlight potentials for action. It helps bridge operational and strategic gaps between actual performance and targets by implementing suitable measures designed to increase the value of the company on a sustained basis.

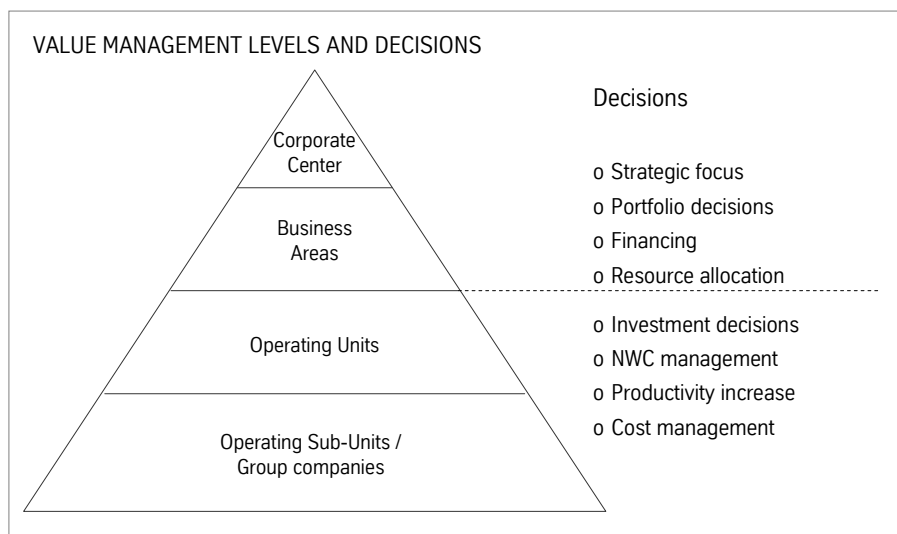


- Sustainable and successful value management requires high-quality strategic and operational planning.
- Strategy and controlling meetings are held to ensure regular communication about targets, strategy and actions between Corporate Center, Business Area, Operating Unit, Operating Sub-Unit and group company. The controlling process is based on a standardized structure at all levels.

- The standardized structure of the controlling process comprises:
 - Strategic dialogue
 - Operational planning: Budget (incl. forecast for current year as starting point for accounting) and two further planning years
 - Monthly forecasts (estimations) for current fiscal year
 - Up-to-date monthly reporting
- To measure value creation at ThyssenKrupp → ThyssenKrupp Value Added (TKVA).
- The focus on value added applies to all management processes. The strategic basis for achieving value-based targets is an active portfolio management system. Concrete steps to increase value are taken through individual investment projects and continuous process optimization. Performance measurement increases transparency in value management and provides the basis for a value- and performance-based compensation system.
- By meeting return on capital expectations, the ThyssenKrupp Group will continue to be an attractive investment in the long-term, securing further growth.

Levels of value management

- Value creation can and must take place at all levels of the ThyssenKrupp Group. Every manager and employee can positively influence the value of the company through his or her actions and decisions.
- These decisions may have varying characteristics. At Group and Business Area levels, the decisions are mainly strategic, aimed at positioning the company for future growth. Portfolio decisions on which businesses to expand and which to divest set the course for the future performance of the Group. It is also important to secure suitable funds, and to decide on how these are allocated in the Group.
- At operating level, the focus is mainly on increasing efficiency and managing growth projects. This can include process optimization, projects to increase sales or the disposal of non-operating assets. Also at operating level growth opportunities can be identified and successfully implemented.



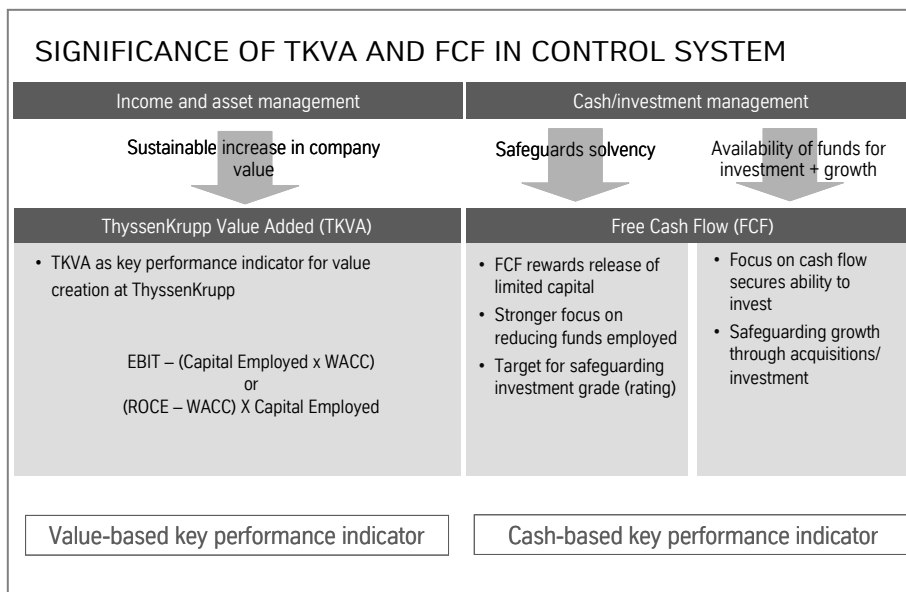
Communication and training

- Communication and training are essential to enable managers and operational decision-makers throughout the Group to make value based decisions. Therefore value-based management is a key element of further training and management talent development. This ensures that new recruits are thoroughly trained in value management techniques.
- External communications about value management are primarily directed at the capital market, providing stakeholders, banks, analysts and rating agencies with transparent information about value performance. For example, the annual reports contain information on ThyssenKrupp Value Added in the period and the most important value drivers. Continuous reporting and the systematic focus on value-based management increases the capital market's confidence in the ThyssenKrupp Group in the long term.

II TKVA as the value based key performance indicator

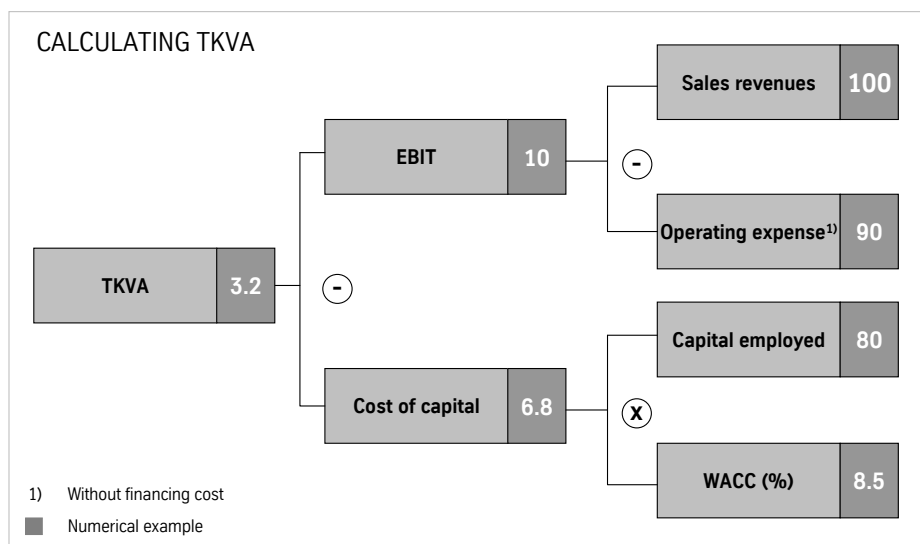
Overview

- Value-based management can only be practiced if a suitable performance indicator is available as an assessment criterion for all decisions. To ensure efficiency in all management processes, a value-based key performance indicator is essential.
- The key performance indicator for value-based management in the ThyssenKrupp Group is TKVA, which measures the value added by the Group, Business Areas, Operating Units, Operating Sub-Units and group companies in different periods.
- Furthermore the earnings-based performance indicator → Earnings Before Interest and Taxes (EBIT) as the main driver of TKVA, and the cash-oriented performance indicator → Free Cash Flow (FCF) for measuring liquidity are vitally important



Value-based key performance indicator TKVA

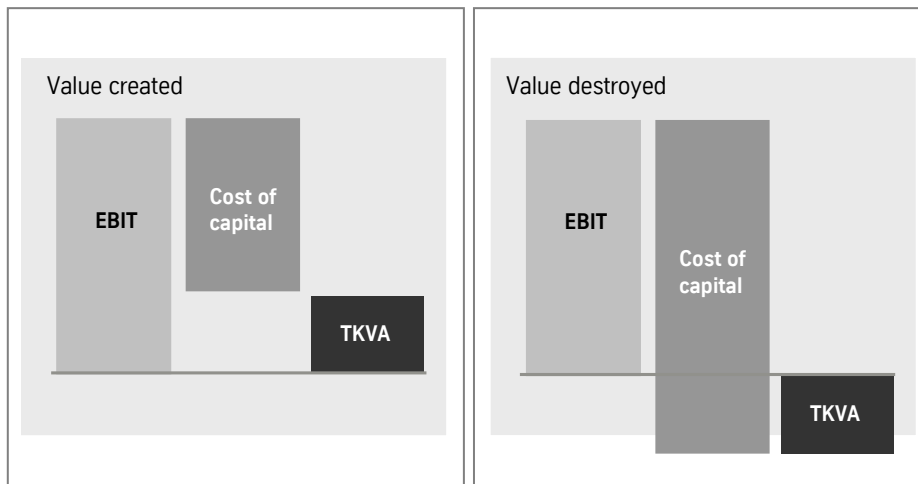
- TKVA measures the value added in a period in absolute terms. Three questions are decisive in determining the TKVA:
 - Which operating income was generated?
 - How much capital was employed to achieve this income?
 - Which return does the capital market expect from ThyssenKrupp?
- TKVA compares EBIT, i.e. income from operations excluding financing costs and taxes, with the cost of capital. The cost of capital represents the expected return on equity and debt. It corresponds to the product of → weighted average cost of capital (= WACC) and → capital employed.



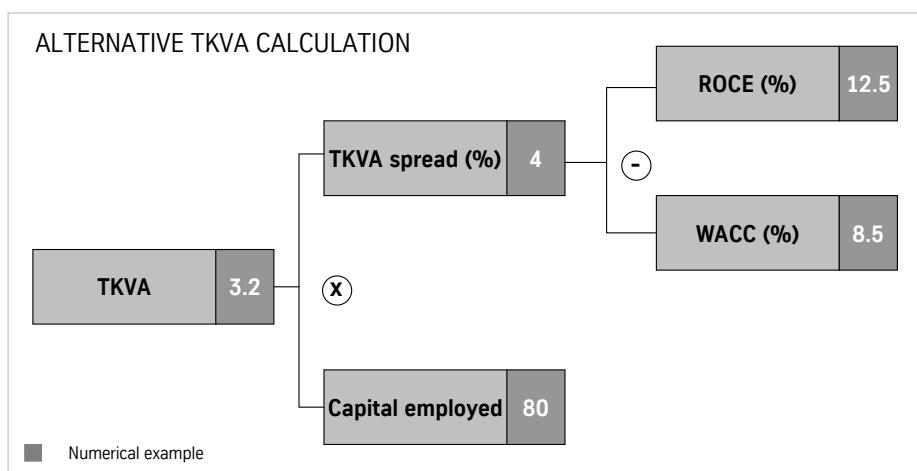
The weighted average cost of capital reflects the return expected by investors, with the following factors applying:

- Capital employed is the capital invested in the businesses.
- The higher the risk of an investment, the higher the expected return. Accordingly equity investors expect a higher return than debt investors. The WACC (weighted average cost of capital) represents the weighted return demanded by all investors.

- The more capital employed invested, the higher the → cost of capital. Value is created when TKVA is positive, i.e. when EBIT exceeds the cost of capital. ThyssenKrupp's WACC of 8.5 % represents the minimum return on capital requirement for all business actions.



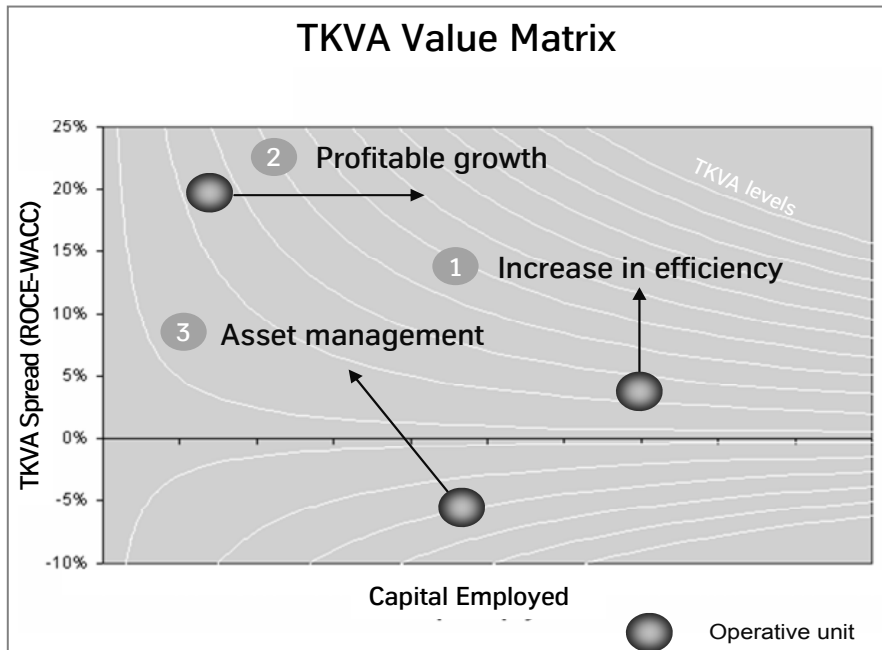
- As an alternative to the calculation shown above, TKVA can also be calculated in relative parameters, using the → TKVA spread or the Return on Capital Employed (ROCE) and WACC. The TKVA spread multiplied by capital employed gives TKVA.



Strategic levers to increase TKVA

Three levers can be used to increase TKVA:

1. Increased operating efficiency: This has a direct positive impact on TKVA. If no additional capital is needed for the improvement measures, the increase in EBIT with constant capital employed leads to an increase in TKVA.
2. Profitable growth: New projects can contribute to profitable growth and thus also to value creation. The condition for this is investment in projects and businesses which generate EBIT higher than the costs of the additional capital invested.
3. Optimization of capital employed: This can be achieved in two ways:
 - Portfolio management: Reducing investment in business activities which do not earn their cost of capital leads to value growth.
 - Elimination of value destroyers
 - Asset management: Reducing capital employed without reducing EBIT leads to value growth.
 - Efficient use of capital available in the company (equipment, buildings, inventories, receivables, liabilities)



The TKVA value matrix shows how these strategic levers impact on TKVA. If the TKVA spread is positive, an operating unit creates value. The curves in the above chart (isoquants) each connect points with the same level of TKVA. A high TKVA spread on low capital has the same effect as a low TKVA spread on high capital. As shown, there are various ways of increasing TKVA to the next level:

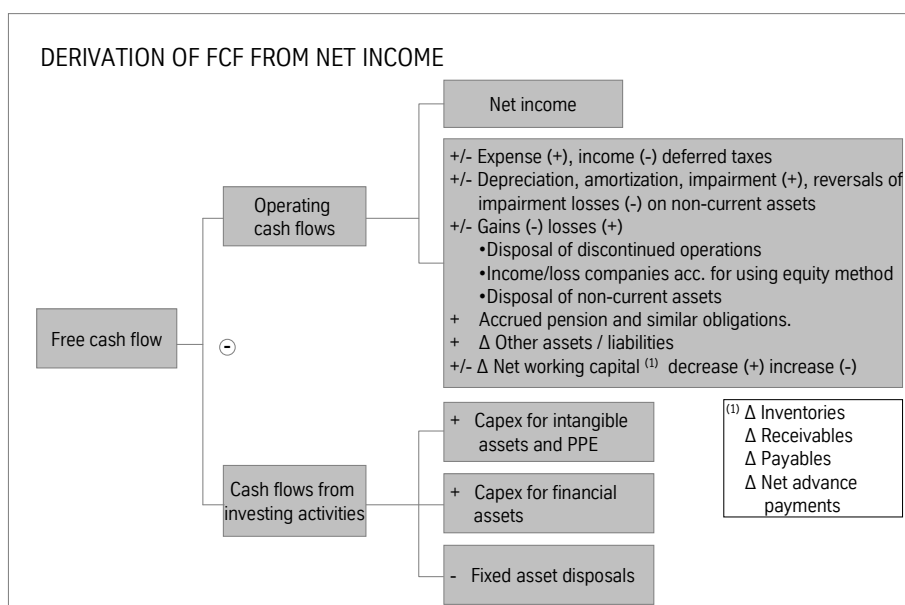
- With high capital employed, an increase in operating efficiency ① can have a major impact on value growth.
- If the TKVA spread is high, profitable growth ② is best suited to increasing value.
- If TKVA is negative, optimization of capital employed ③ is one way of increasing TKVA.

EBIT as the main driver of TKVA

- Since fiscal year 2010/2011 ThyssenKrupp's key earnings performance indicator is EBIT instead of EBT. This change-over will focus control of the Group even more systematically on the earnings components that can be influenced by operational management. Components which can only be optimized and assessed at Group level – in particular non-operating financial income and taxes on income – are omitted from the assessment of the Operating Units.
- A further advantage of basing control on EBIT is that EBIT is used to calculate TKVA. This means that operating control and value management are optimally linked.

Cash-based key performance indicator Free Cash Flow (FCF)

- Growth-based value increases generally require more investment funds than can be generated from → Operating Cash Flow (OCF). A balanced portfolio therefore comprises a mixture of value drivers and cash providers to finance growth.
- The FCF remaining after deduction of necessary investments (e.g. replacement investments) is available among other things for further strategic investments and growth.
- FCF focuses on the following targets:
 - Securing scope for innovation
 - Achieving growth e.g. through strategic acquisitions
 - Securing a continuous dividend payment
 - Improving the balance sheet structure and optimizing gearing by reducing financial debt
 - Maintaining stable ratings (investment grade)



Return on Capital Employed (ROCE)

- Return on Capital Employed (ROCE) has a significant effect on TKVA and is calculated as follows:

$$\text{ROCE} = \frac{\text{EBIT} * 100}{\text{Ø Capital Employed}}$$

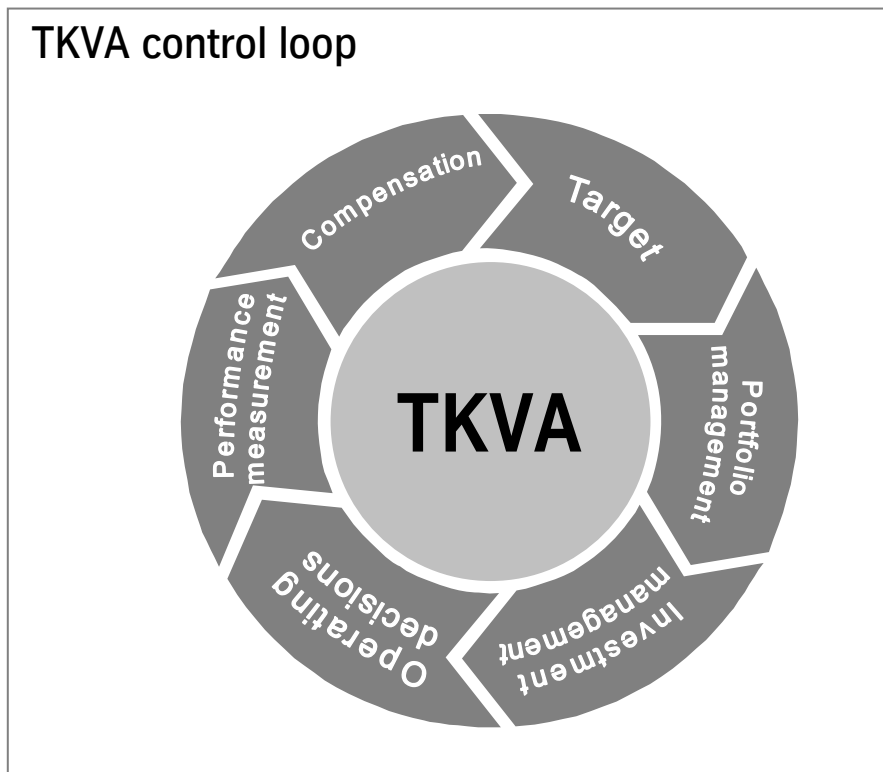
- In some cases, using ROCE as the parameter to be maximized can lead to misallocation of resources. If a business's ROCE is already very high, there are only few measures that could achieve an equally high or even higher ROCE. New projects in particular in the area of portfolio reorganization can therefore cause ROCE to fall and are rejected as a result. However, every project which earns more than its cost of capital (WACC) generates positive TKVA and therefore creates value.
- If a business's ROCE is relatively low, there are generally numerous opportunities for increasing ROCE with new projects. But caution is advised. Here too the rule is: New projects should only be carried out if the project's ROCE is higher than its WACC. Projects which increase the current ROCE but generate a return lower than their WACC destroy value.
- ROCE is a relative indicator and in some cases is difficult or impossible to interpret. ThyssenKrupp therefore focuses on the use of absolute indicators to calculate TKVA.

III Application in management processes

TKVA control loop

- A key factor for the success of value management is to focus the entire management system on the key performance indicator TKVA.
- TKVA targets are defined during the target setting process. They serve as a benchmark for business performance and identify the value-adding potential of the Group, the Business Areas, Operating Units, Operating Sub-Units and group companies.
- Value-based portfolio management promotes those businesses that offer the highest value potential for the ThyssenKrupp Group based on their market situation and competence. The following alternatives exist:
 - Expanding growth areas
 - Measures to improve efficiency
 - Divestment of non-core activities
- Investment projects are assessed and approved on the basis of a profitability analyses focused on their contribution to value creation.
- At operating level, all business decisions are examined in terms of their long-term contribution to value creation.
- The extent to which the TKVA targets, defined in the target setting process are achieved, becomes transparent during performance measurement. The results of performance measurement reveal the need for action to close strategic and operational gaps.
- A further element is the linking of business targets with compensation.

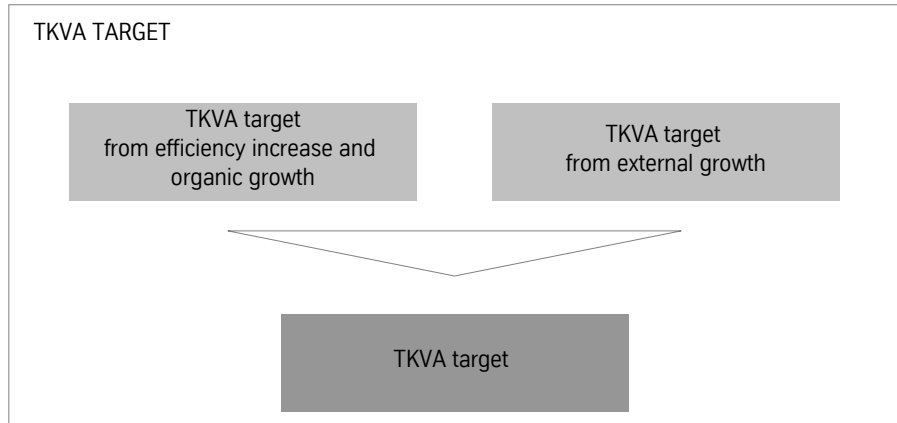
TKVA control loop



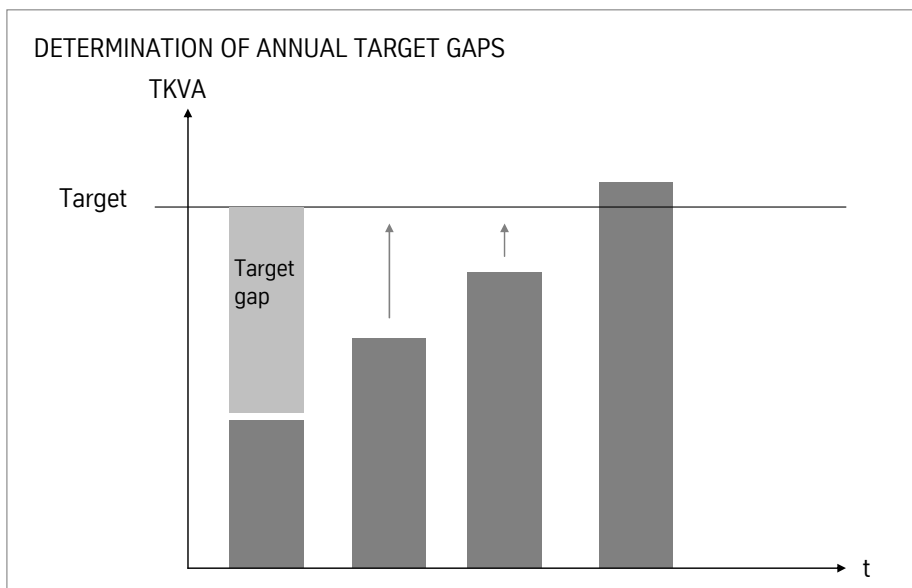
Elements of the control loop

A Target setting

- The ThyssenKrupp Group pursues competition-based targets. The performance of the individual Business Areas is compared with that of their peers.
- The TKVA targets for the Group and the Business Areas are therefore calculated on the basis of benchmark comparisons with the best-in-class companies in the individual fields of business.
- Target values for operating efficiency are calculated on the basis of analyses of the performance of peer companies. In addition, strategic components in the form of growth assumptions are factored into the targets in anticipation of future sales growth and taking into account realistic estimates for future investments.



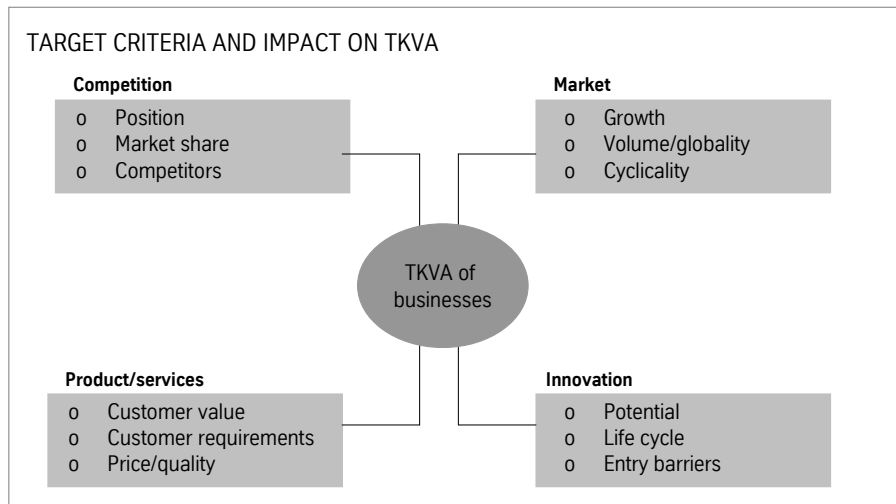
If this data is pooled TKVA targets are generated for the Business Areas and the Group which have to be achieved on a sustainable basis. By comparing current performance figures with the TKVA targets it is possible to measure the gap to the target, to be closed gradually over subsequent years.



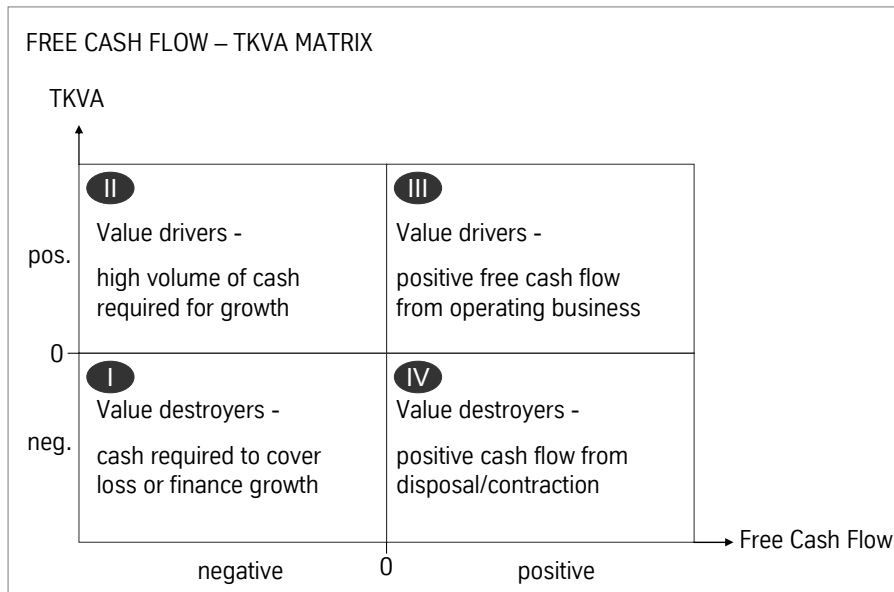
B Portfolio management

- The globalization of markets and the attendant need for consolidation and size requires a concentration on selected businesses. This makes it necessary to withdraw from non-core activities in a timely and profitable way. It also means that other business activities can be strengthened and new business activities created, e.g. by entering into new markets.
- The aim of portfolio management at ThyssenKrupp is to expand selected business activities, exploit new growth potential, and reduce non-core activities in the portfolio step by step. Through targeted expansion and divestment, portfolio management provides the foundation at strategic level for future value growth.
- Three basic strategies are available in portfolio management:
 - Expand Targeted support of growth areas to exploit future value potential
 - Hold Continuous improvement of existing core businesses to achieve sustainable efficiency improvements
 - Divest Withdrawal from businesses that are not core activities so as to generate new capital for growth in other areas
- In the long term only value-increasing activities have a place in the ThyssenKrupp Group's portfolio.

- A key factor for the success of value management is the use of target criteria to identify business activities which will continue to perform well in the future. The requirements to be met in terms of market, competition, product/services and innovation criteria are defined and continuously updated by the Corporate Center, Business Area, Operating Unit, Operating Sub-Unit and Group companies together. The controlling system provides reliable measurement of these criteria.



- A balanced relationship between cash providers to finance growth, and value drivers to generate value enhancement should be established by means of constant portfolio management.
- Among other things, FCF indicates the amount available for financing growth.



After entering businesses in the FCF-TKVA matrix, the following core questions must be asked on an ongoing basis for each business:

- I Can others do our business better?
Is it a growth area?
- II Can profitability be maintained even without major investments?
- III Are there further growth opportunities?
- IV Have all opportunities for increasing efficiency been exhausted?
Is the business the right size?

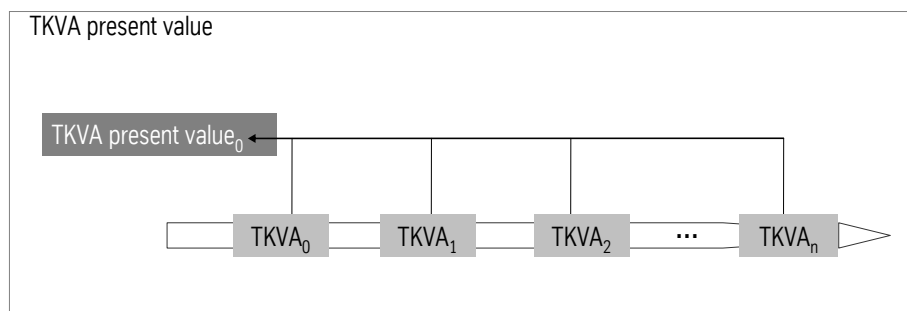
C Investment control

1. Allocation of investment funds

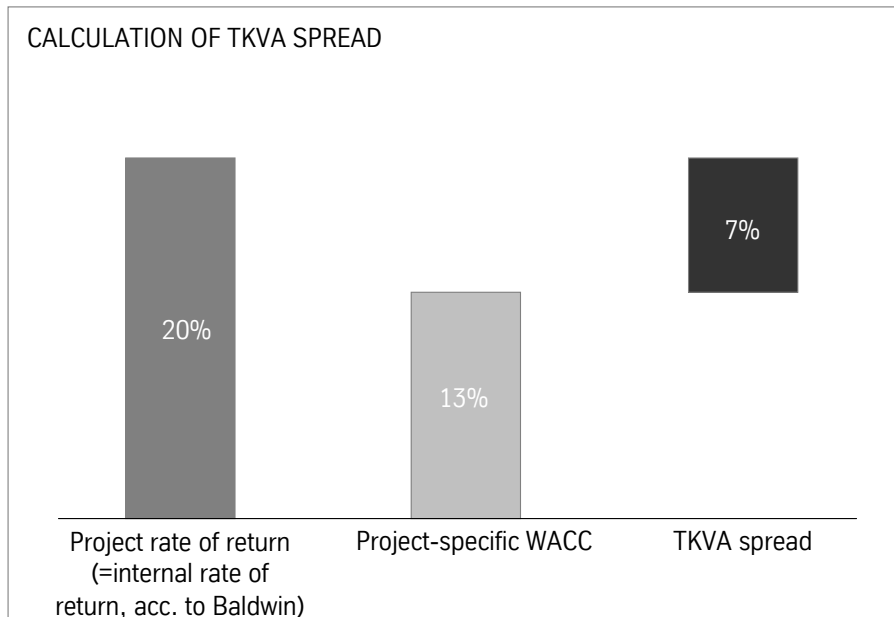
- The investment framework is fixed once a year. It results from the planned OCFs of the Business Areas, investments already approved but not yet completed, planned disposals, and the target → net financial debt.
- After the investment framework has been set, the investment funds are allocated to the Business Areas by the Executive Board of ThyssenKrupp AG. Each Business Area is given a capital expenditure target for the next fiscal year. The target comprises three different volumes:
 - the substance-preserving volume (Business Area volume)
 - the value-oriented volume (Business Area volume)
 - the strategic volume
- The substance-preserving volume is based on a percentage of the Business Area's average depreciation and amortization. This is 45 %.
- The value-oriented volume is based generally on TKVA. In view of the Group's current debt and rating situation, the value-oriented volume for the Business Areas is allocated on the basis of OCF. As with the substance-preserving volume, both actual and plan figures are taken into account.
- The strategic volume is held centrally at ThyssenKrupp AG and is only allocated after individual investment projects have been analyzed and approved.

2. Investment evaluation/assessment

- In addition to maintaining operations, regular investment is needed to support strategic growth and expand existing business activities. Investment projects carried out today form the basis for future TKVA.
- As the funds available are limited, not all value-creating projects can be carried out. Decisions on the use of investment funds are made by the Business Areas and the Group on the basis of economic and strategic considerations.
- The profitability of investment projects is assessed with the help of a standard Group model for profitability analyses which is used to calculate a → TKVA present value and a TKVA spread.
- The TKVA present value is calculated by discounting each TKVA expected as a result of the investment. It corresponds to the capital value of an investment after discounting the expected cash flows. If this figure is positive, the project creates value.



- The most important key controlling figure in assessing investment projects is the TKVA spread. It measures the difference between the → project rate of return and the project-specific WACC. Every project must achieve a → minimum TKVA spread of 3 %.

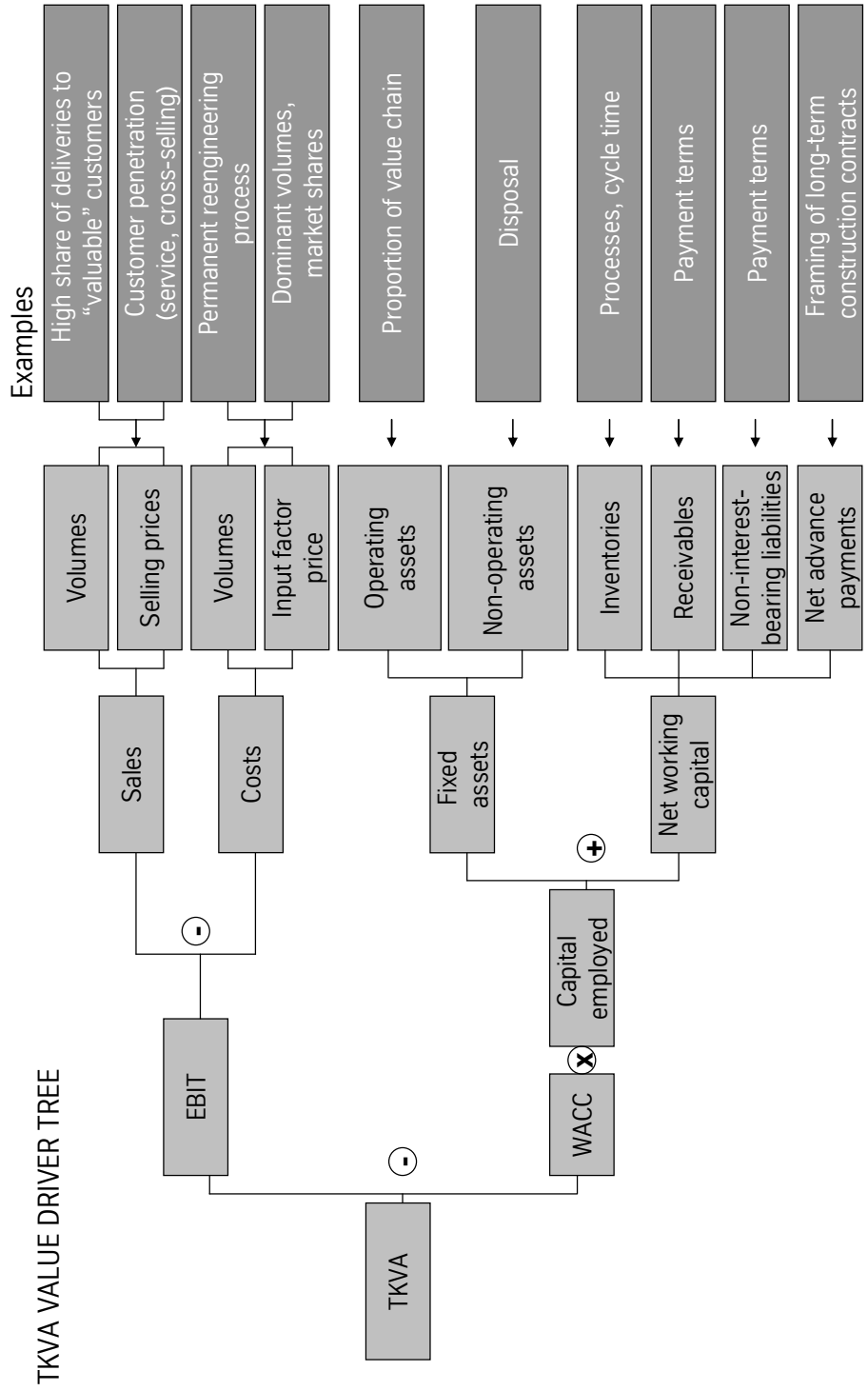


- The use of a project specific WACC allows an individual risk assessment. The following also applies to investments: The higher the risk of capital expenditure, the higher the expectation of interest.
- To determine the project-specific WACC, the following aspects are considered:
 - Business Area, wishing to carry out the investment,
 - country, in which the investment is to be carried out,
 - currency, in which the majority of sales are to be generated,
 - country-specific tax rate

To this extent the project-specific WACC may differ from the WACC used to calculate the TKVA e.g. of a Business Area.

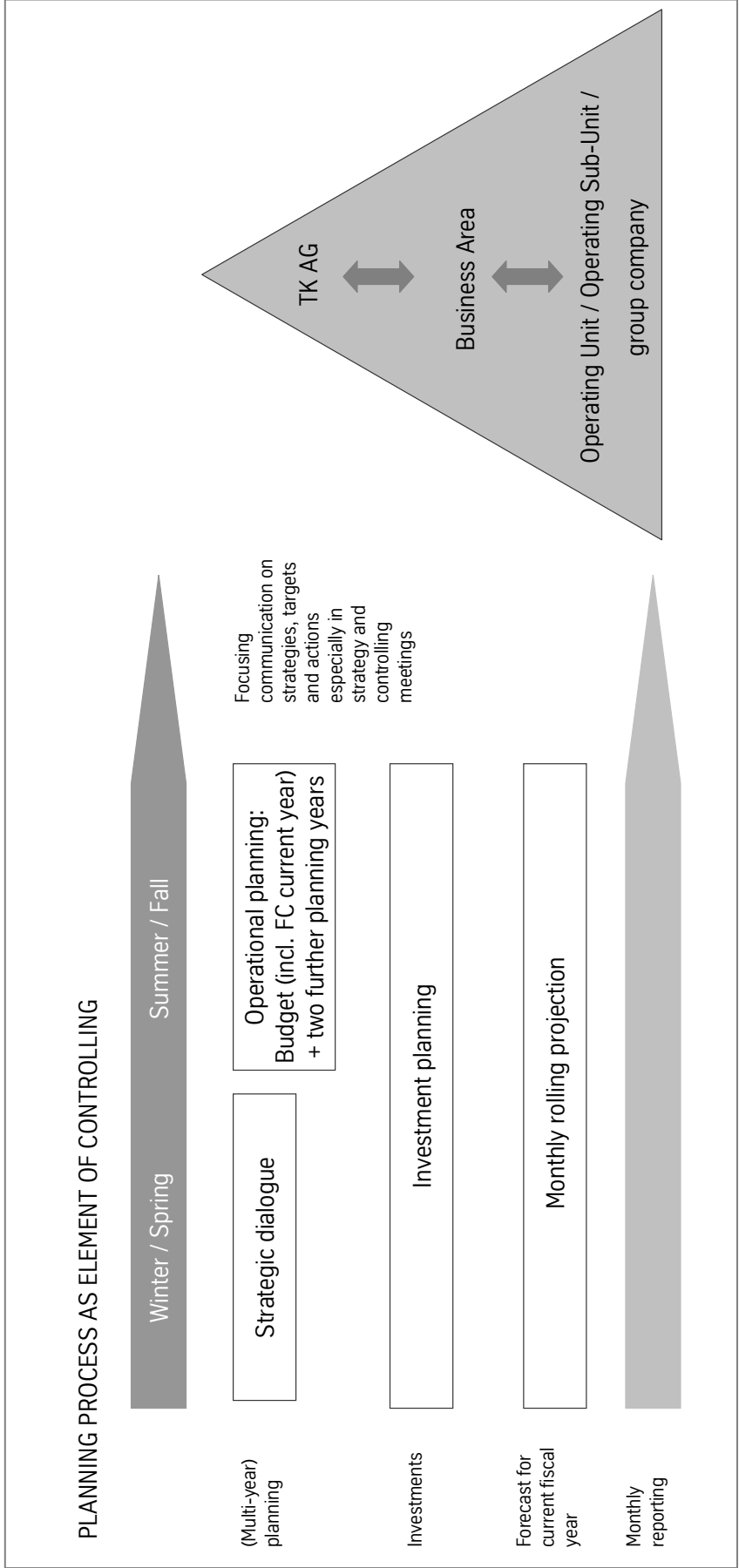
D Operating decisions

- All operating decisions likewise have to be reviewed in terms of their long-term contribution to value growth.
- Decisions aimed at increasing operating efficiency make a significant contribution to overall value growth. Potential for this is provided for example by programs to reduce net working capital, productivity increases and cost reductions.
- The individual performance indicators at operational level have to be analyzed in terms of cause and effect to ensure a consistent focus on value growth.
- The financial indicators have to be linked directly to the central performance indicator TKVA.
- The qualitative levers have only an indirect affect on TKVA. While improvements in customer focus, employee development and internal processes can be measured immediately, it may take years before the positive effect is reflected in TKVA in the form of value growth. Here too, value growth is the primary medium- and long-term goal, and is actively supported by the quality levers.



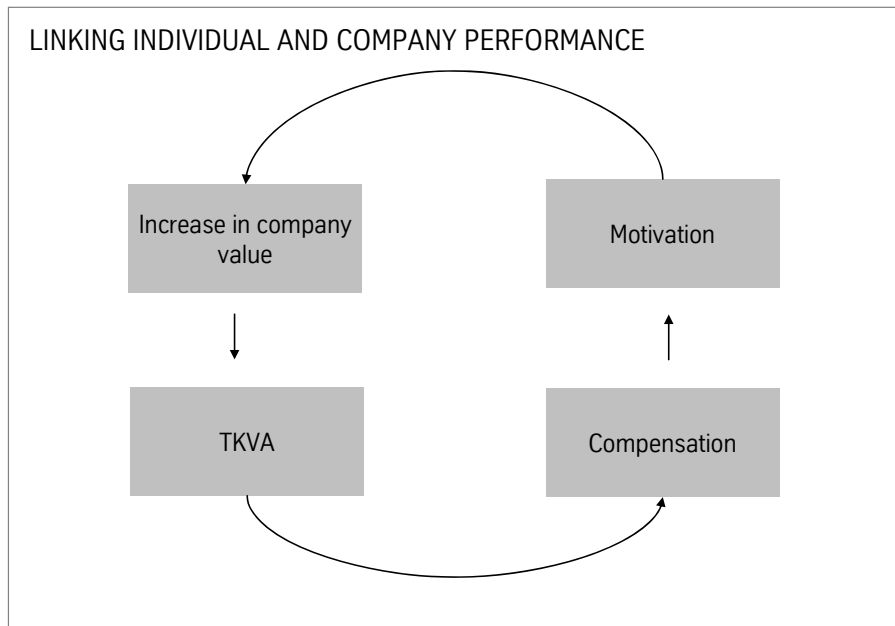
E Performance measurement

- In order to be able to assess the effects of strategic decisions and operating measures, actual performance is continuously measured and compared with target performance.
- However, performance is not only measured at company level. Completed investment projects are also compared with the original profitability analyses. Those audits help to understand which planning assumptions did not materialize and which did. This reflection can be used to optimize the assessment criteria for future investment decisions.
- The implementation of value based management requires regular reporting on business activities in all areas of the company. In the ThyssenKrupp Group regular communication about targets, strategy and actions between corporate center, Business Area, Operating Unit, Operating Sub-Unit and group company takes place in strategy and controlling meetings focusing on the following key areas:
 - Strategic dialogue to establish a preliminary structure for Group development and agreement of guidelines for operational planning.
 - Operational planning: Budget (incl. forecast for current year as a starting point for accounting) and two further planning years.
 - Analyses of the current fiscal year and previous years

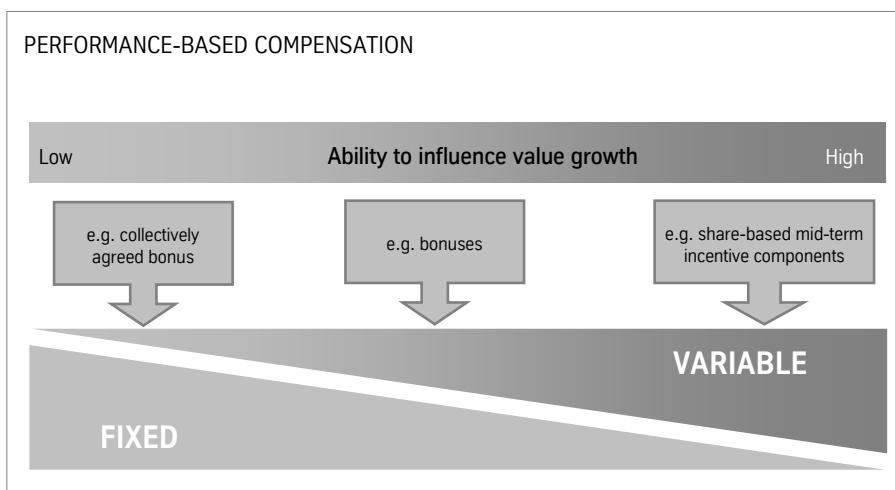


F Compensation

- One element of value-based management is to link the individual performance of employees with the performance of the company. This means that the central performance indicators must be included in the incentive system.



- A key element of the value management system is therefore to link compensation to business targets.



- In the ThyssenKrupp Group's bonus system, bonuses depend on business success and individual performance. Business success is measured on the basis of the central performance indicators used in value management. The variable performance-based component increases with the executive's ability to influence performance.

IV Appendix

Key figures/definitions

Capital employed

In the ThyssenKrupp Group capital employed is based on the asset side and comprises mainly fixed assets plus net working capital.

Start-up and business expansion expenses (HBI)
+ Non-current assets
- Interest costs during construction, property, plant and equipment, and other non-current assets
- Loans to affiliated companies
- Loans to associated companies
- Non-current securities
- Other loans
- Limited availability cash/equivalents >1year
- Deferred tax assets
- Shares in affiliated companies
= Non-current assets (capital employed calculation)
+ Assets held for sale
+ Net working capital
+ Net advance payments surplus (NAPS)
= Capital employed calculated on basis of assets

Capital employed quantifies the net book value of invested capital.

The average capital employed is used to calculate TKVA and ROCE. A five-point average is used in order to determine the average capital employed for interim reporting purposes as precisely as possible. This method also allows for possible fluctuations during the fiscal year.

CALCULATION OF AVERAGE CAPITAL EMPLOYED

Calculation of average CE	Year 0	Q1	Q2	Q3	Q4
CE date	100.0	150.0	130.0	100.0	120.0

$\emptyset Q1=125$ $\text{ave. } Q2=140$
 $\emptyset Q1 + \emptyset Q2 = 132.5$

Average CE		125.0	140.0	115.0	110.0
Proportional cost of capital on - average CE		3.13	3.50	2.88	2.75

Cumulated average CE		125.0	132.5	126.7	122.5
Cumulated cost of capital		3.13	6.63	9.50	12.25

Net advance payments surplus (NAPS)

The net advance payments surplus is essentially defined as the difference between advance payments received from customers and advance payments made to suppliers.

Advance payments received
- Advance payments made
= Net advance payments surplus (NAPS)

Earnings before taxes and interest (EBIT)

Sales
- Cost of sales
= Gross margin
- Selling expenses
- General and administrative expenses
+ Other operating income
- Other operating expenses
+ Net income/loss from equity investments
- Accretion provisions
- Impact from changes in interest
+ Depreciation of capitalized interest during contruction period
- Reversal of depreciation of capitalized interest during contruction period
+ WACC * NAPS
= Earnings before interest and taxes (EBIT)

The calculation of EBIT at Business Area level takes into account that, particularly in the Business Areas with long-term construction contracts, the receipt of advance payments is an integral component of risk management (to avoid default risks on the customer side) and thus of operating business. To take appropriate consideration in value management of these advance payments and the interests and financing effects that can be achieved with them, the EBIT of the relevant Business Area is increased by an imputed income amount calculated by assigning a return to the average net advance payments surplus equal to the WACC for the Business Area.

The capital employed used in the calculation of TKVA is also increased in the Business Areas by the amount of the net advance payments surpluses.

As the liquidity generated from net advance payments surpluses is used between the Business Areas, the positive imputed income contributions in EBIT and the increases to capital employed are eliminated again during consolidation at ThyssenKrupp Group level and are therefore not included in the Group's key figures.

Cost of capital

The cost of capital is the return required by equity capital and debt capital providers. It is calculated as follows:

$$\text{Cost of capital} = \text{Average Capital Employed} \times \text{WACC}$$

Weighted average cost of capital (WACC)

The weighted average cost of capital, which can also be interpreted as the minimum return required by investors, comprises the weighted average cost of equity and debt as well as the interest rate for pension provisions. In the ThyssenKrupp Group WACC is calculated on a pre-tax basis.

The cost of equity represents the minimum average return on capital demanded by shareholders from the equity tied up in the ThyssenKrupp Group. The return is based on the income from a risk-free alternative investment (risk-free interest rate) plus a risk premium. The risk-free interest rate is calculated for ThyssenKrupp based on the average return on an investment in government bonds over the previous 5 years. For the WACC calculation the risk-free interest rate is 3.9 %.

The risk premium is influenced by the specific risk of the business-segment in relation to the overall market. The risk of the overall market is reflected in the market risk premium of 4 %. The market risk premium describes the general risk of an investment in stocks in a specific market in relation to a risk-free investment. A risk premium of 4 % therefore implies that the return expected by the market for stocks is on average 4 % higher than the return expected for an investment in risk-free securities (e.g. government bonds).

The risk premium for the individual businesses depends on the so-called beta factor*. The beta factor is multiplied by the market risk premium to calculate the specific risk premium for each business. The beta factor for the ThyssenKrupp Group is 1, which means that the risk premium for the Group is 4 % (1.0 x 4 %).

The return requirement of the equity investors calculated from the risk-free interest rate, market risk premium and beta factor represents the cost of equity after operating taxes. This percentage-rate has to be adjusted to reflect the marginal tax rate, which is approx. 31 % in Germany, to obtain the cost of equity before taxes:

$$\text{Cost of Equity} = \frac{r_{\text{risk-free}} + \text{Beta - Faktor} * \text{MRP}}{1 - t}$$

where:

- t = Marginal tax rate
- MRP = Market risk premium
- r = Interest rate

The weighted average cost of equity for the ThyssenKrupp Group is thus 11.4 %:

$$\text{Cost of equity TK Group} = \frac{3.9\% + 1.0 * 4.0\%}{1 - 0.31} = \frac{7.9\%}{0.69} = 11.4\%$$

*) The beta factor indicates the relationship between the stock and an index (e.g. total market). It measures the sensitivity of the stock to changes in an index.

If the beta factor is:

- = 1, the share price reflects the performance of the index
- < 1, the stock moves less than the index
- > 1, the stock moves more than the index

The cost of debt (before operating taxes) is the average interest rate for long-term loans. ThyssenKrupp can obtain financing on the capital market at the risk-free interest rate plus a debt spread. For calculating the Group's WACC, a spread of 250 base points, i.e. 2.5 %, is currently assumed.

$\text{Cost of debt TK Group} = 3.9\% + 2.5\% = 6.4\%$
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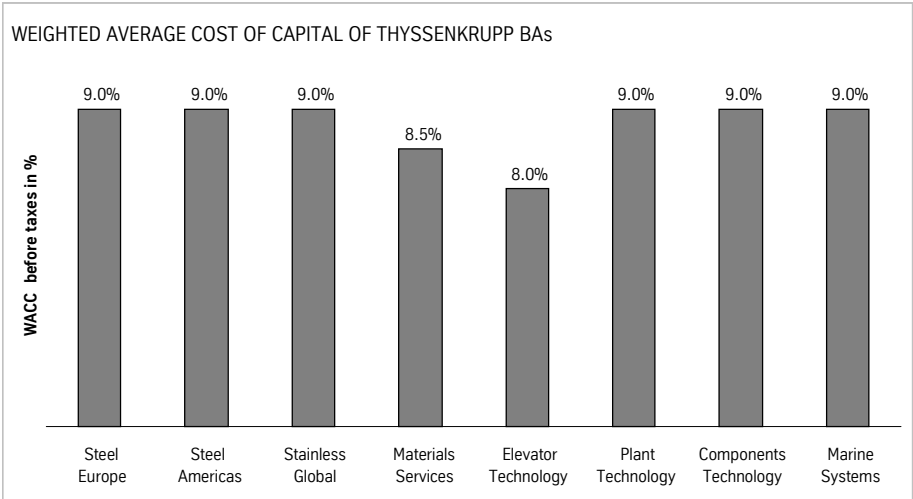
The interest rate for pension provisions is calculated on the basis of the weighted 5-year average discount rate for accrued pension obligations (Germany) and healthcare obligations. It is currently 5.4 %.

On account of the above factors WACC can vary over time – e.g. due to tax changes, changes in the risk structure of business activities, changes in interest rates or changes in the target capital structure. It is therefore reviewed regularly by ThyssenKrupp AG and if necessary updated.

CALCULATION OF WEIGHTED AVERAGE COST OF CAPITAL			WACC before taxes
	Cost of capital before taxes	Target for capital structure	
Equity	11.4%	45%	8.5%
Debt	6.4%	25%	
Pension obligations	5.4%	30%	

If the average cost rates calculated are weighted with the ThyssenKrupp target capital structure, the weighted average cost of capital before taxes is 8.5 %.

The Business Areas use specific WACCs reflecting the risk structure of the respective Business Area. The higher a business activity's operating risk, the higher its WACC. The Business Areas' capital structure is not taken into account in determining WACC. Instead, the Group's target capital structure is used in order to completely separate financing decisions from operating business.



Specific WACCs are also used to assess investment projects. The project-specific WACC mainly depends on the Business Area conducting the project, the country, the currency and the local tax rate.

Net present value (NPV)

The discounting of cash flows is an alternative/complementary approach to TKVA investment analyses for decision-making. The general formula for calculating the net present value of a series of cash flows is:

$$NPV = \sum_{t=-(t_{\text{Const}}-1)}^n \frac{CF_t}{(1+WACC)^t}$$

where:

NPV	=	Net present value
t_{Const}	=	Construction time
n	=	Period under consideration from commissioning
WACC	=	Weighted average cost of capital
CF	=	Cash flow (cash outflows for investments, cash inflows, net)

In analyzing cash flows in arrears and calculating the cost of capital via capital employed, the net present value and TKVA present value are identical at the beginning of the year.

Free cash flow (FCF)

Free cash flow indicates the extent to which net cash inflows have been generated in a period (cash-based perspective). It provides information about the financial performance of individual reporting units within the Group.

As the calculation of FCF directly on the basis of cash flows (cash inflows minus cash outflows) is impracticable, an indirect method is used for calculating OCF as a component of FCF based on the net income/loss for the year.

Net income/loss
+ Income from sale of discontinued operations
+ Net deferred tax liabilities (+ expense, - income)
+/- Amortization/depreciation/impairment and reversals of impairment of non-current assets
+ Losses (+), gains (-) from investments, equity method
+ Losses (+), gains (-) on disposal of non-current assets
+ Δ NWC, increase (+), decrease (-)
+ Δ Provisions for pensions, similar obligations and other provisions
+ Δ Other assets / liabilities
= Operating cash flow (OCF)
-/+ Additions (CAPEX CF) and disposals of property, plant and equipment incl. investment properties and intangible assets
- Acquisition of investments valued by equity method, financial assets and consolidated companies
+ Disposal of investments valued by equity method, financial assets and previously consolidated companies
+/- Cash and cash equivalents from disposal (+) / purchase (-) of companies
= Cash flows from investing activities (CFI)
= Free cash flow (FCF)

Net financial debt

Net financial debt is calculated from the total current and non-current financial debt less loans to affiliated companies (from Business Area level down) and liquid funds (cash and cash equivalents + current securities). Negative net financial debt represents a credit balance.

Project rate of return (internal rate of return according to Baldwin)

The project rate of return (or internal rate of return according to Baldwin) measures the average return on the capital employed to an investment project. It shows how high the annual return on an alternative investment of equal amount would have to be to generate the same value growth as the investment project. It is assumed that the returns from the investment project will be reinvested at a specific target rate of return, e.g. WACC.

The project rate of return can be calculated in two different ways, both leading to the same result. The first is based on TKVA, the second on cash flow.

The project rate of return sets the terminal value of the TKVA values at year-end plus the terminal value of the investment sum in relation to the investment sum (incl. present value of rents/leases).

The project rate of return is calculated as follows:

$$r_{TKVA} = \sqrt[n]{\frac{TKVA_{\text{terminal value}} + \text{terminal val. of invest. expenditure}}{\text{Present value of investment expenditure}}} - 1$$

$$= \sqrt[n]{\frac{\left(\sum_{t=1}^n TKVA_t \times (1 + WACC)^{n-t}\right) + A_0 \times (1 + WACC)^n}{A_0}} - 1$$

where:

r_{TKVA}	= Project rate of return
$TKVA_t$	= TKVA of period t
A_0	= Present value of the total investment

Based on the assumption that TKVA and discounted cash flow (DCF) are present value-neutral, the project rate of return and the internal rate of return according to Baldwin are identical.

The internal rate of return according to Baldwin is calculated by dividing the terminal value of the revenue surpluses E_t by the present value of the total investment A_0 . The result is then annualized.

$$r = \sqrt[n]{\frac{\sum_{t=1}^n E_t \times (1+i)^{n-t}}{A_0}} - 1$$

where: r = Internal rate of return
 i = Interest rate for the reinvestment
 n = Period unter consideration
 A_0 = Present value of the total investment
 E_t = Terminal value of revenue surpluses in t

ThyssenKrupp Value Added (TKVA)

TKVA measures the income of a period after cost of capital. Only if EBIT exceeds the total cost of capital value is added. TKVA can be calculated in two ways:

Calculation by means of absolute indicators:

$$\begin{aligned} \text{TKVA} &= \text{EBIT} - \text{Cost of capital} \\ &= \text{EBIT} - \text{WACC} \times \text{CE} \end{aligned}$$

Calculation by means of relative indicators:

$$\text{TKVA} = (\text{ROCE} - \text{WACC}) \times \text{CE}$$

TKVA present value

Net present value (NPV) provides information on the economic benefit of investment projects. If the net present value is positive, a project will earn its cost of capital. A positive net present value or TKVA present value corresponds to the value added by the project discounted to the present date. The \rightarrow net present value represents the present value of future cash flows at the start-up date. The TKVA present value is equal to the sum of the expected TKVAs discounted to the start-up date.

The present value of TKVA is equal to the NPV under the following premises:

- Decursive consideration of cash out, and
- Calculation of cost of capital on capital employed at the beginning of the year

TKVA spread

The TKVA spread represents the relative value created by the capital employed and is calculated by deducting the WACC from the average return on capital employed. The TKVA spread is mainly useful in prioritizing investment projects when capital funds are scarce.

The return on capital employed (ROCE) for the ThyssenKrupp Group indicates the relative value added over a year. In addition, return on capital employed can also be calculated for individual investment projects over the term of each project. Because multiple periods are involved, an average return is calculated. This is the → project rate of return.

Both approaches serve to assess value added, either in relation to a company or to an individual investment project.

Related to a company:

$$\text{TKVA}_{\text{Spread}} = \text{ROCE} - \text{WACC}$$

Related to individual investment projects:

$$\begin{array}{l} \text{TKVA}_{\text{Spread}} = r_{\text{TKVA}} - \text{WACC}_{\text{Project}} \\ \text{where: } r_{\text{TKVA}} = \text{Project rate of return} \end{array}$$

Minimum TKVA spread

The minimum TKVA spread for an investment project is 3 %. The aim of this is to secure a minimum level of value creation. However, achieving the minimum TKVA spread is not the only and exclusive criterion influencing investment decisions.

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