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The relevance of net working capital for value based management and its consideration within an Economic Value Added (EVA) framework

Abstract

The EVA framework[1] tries to embrace the traditional liquidity oriented working capital discussion and the more recent profit oriented access to the topic and positions working capital management within a shareholder value strategy. Our theoretical paper challenges the predictability of the impact working capital management has on EVA and thus challenges the need for working capital management being included in EVA based incentive systems.

Our findings underline the complexity and limited predictability of measures addressing working capital in an EVA context and thus demonstrate the limitations of management influence on EVA.

Keywords: working capital management, value based management, Economic Value Added (EVA).
JEL Classification: G31, L21, M21.

1. Introduction

Europe is actually confronted with low interest rates and high capital availability. This environment challenges the liquidity focus of existing working capital research[2]. Since profitable reinvestment of freed cash is not always available,

[1] Stern Stewart & Co. have even trademarked the concept.
[2] A detailed literature review can be found in [Kroflin, Kratz 2015].

the dictum of working capital management as working capital reduction has to be questioned. Instead, a more profitability oriented or even value based perspective would require a consideration of working capital management as an element of value creation (EVA). Thus, the consequences of working capital reduction in such an environment are questioned. We reflect whether the impact of working capital management on EVA is predictable and whether working capital management should be included in an EVA based incentive system.

Therefore, the present research traces the impacts of working capital management on EVA and shows that there is an explanation gap when it comes to the predictability of the potential impact that changes in working capital might have on EVA. It thus challenges the meaningfulness of working capital reduction as a key performance indicator within an EVA network and argues for a more moderate access to EVA management.

The paper is structured as follows: Section 2 introduces the EVA concept as a useful tool for the analysis. Section 3 systemizes possible patterns of interaction between changes in net working capital and its components. Section 4 then integrates these considerations into the EVA framework. Finally, section 5 summarizes the results.

2. The concept of Economic Value Added as a methodology for analyzing the potential link between working capital and shareholder value

The rationale underlying the concept of value based management is the idea that management must create shareholder value. Therefore, instead of focusing on a company's bottom line, a comprehensive shareholder value perspective requires an analysis of a company's profitability relative to its cost of capital. The cost of capital related to the company is in turn largely determined by the company's risk characteristics [Copeland, Goedhart, Wessels 2005].

Traditional views on working capital management cannot give an answer to the question if and how working capital management interacts with a firm's overall goal to create shareholder value. In order to be able to analyze and measure the impact of net working capital decisions on shareholder value, the economic value added framework is employed.

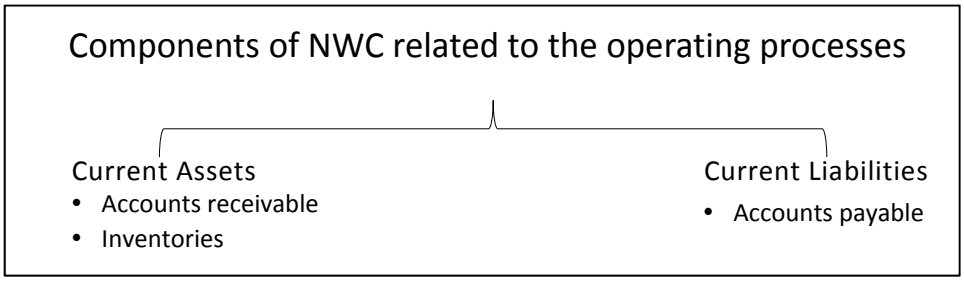
As shown in formula (1) the Economic Value Added (EVA) defined for period t is calculated by deducting a charge for the cost of capital employed within the operating process from the after tax operating income. So EVA recognizes

that in order to add value to the company the after tax operating income has to exceed the cost of capital [Pfitzner, Hilbert 2014][3].

$$EVA_t = NOPAT_t - Invested\ Capital_{t-1} * WACC \quad (1)$$

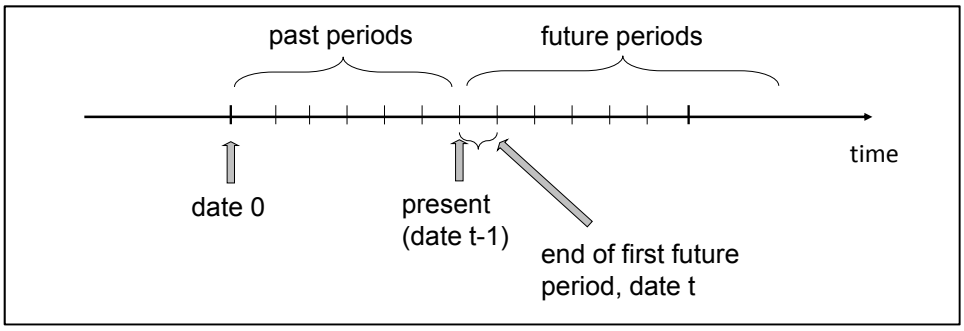
Since this framework puts the focus on the operating processes within the firm (after tax operating income minus a charge for the cost of capital employed in the operating process), net working capital (NWC) is defined as follows [Meyer 2007, p. 37]:

Figure 1. Components of working capital



Another relevant aspect is time setting. As shown in Figure 2 it is assumed that in period 0, a decision is made to establish a certain level of net working capital. In any subsequent period, e.g. in period *t–1*, management has the flexibility to alter the amount of net working capital subsequently to its original decision by means of working capital management. Then the consequences for EVA_t, representing the economic value added predicted for the first future period, can be analyzed.

Figure 2. Time setting

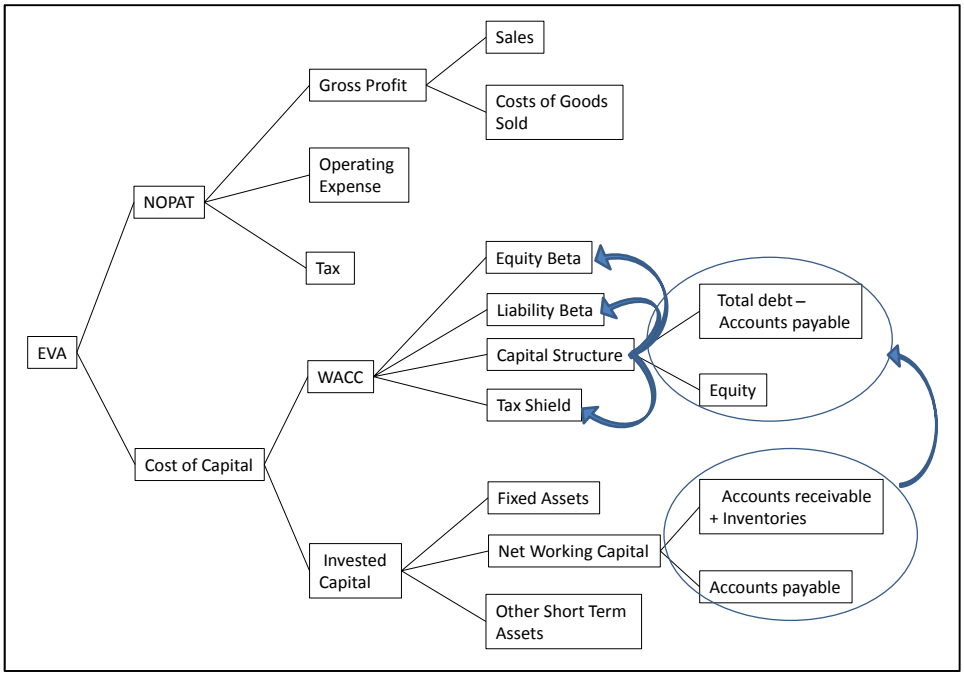


[3] In this formula, WACC represents the Weighted Average Cost of Capital, NOPAT the Net Operating Profit after Tax.

Once the concept of economic value added is chosen as the company's underlying target setting logic it is necessary to identify key performance indicators (KPIs) which are used for operational management and ascribed to their EVA relevance.

In order to analyze how decisions that alter NWC might affect EVA the value driver tree is an appropriate tool since it allows a step by step breakdown of EVA into its separate components. This is to identify the underlying reasons of changes in EVA. Figure 3 illustrates this staged approach by showing the dependence of EVA on NWC within the EVA-calculation scheme. As will be shown in the course of this research it cannot fully uncover how variables within the value driver tree precisely interact, like for instance the way the amount of inventories might affect sales.

Figure 3. Structure of a value driver tree



Due to the fact that accounts payable bear no interest charge accounts payable are deducted from total debt for the purpose of calculating the firm's debt--to-equity ratio. Based on the same rationale accounts payable are deducted from total assets for the purpose of calculating invested capital. The impact of a firm's capital structure on equity beta, liability beta, and debt induced tax shield are in accordance with the capital asset pricing model, a model that describes the relationship between risk and expected return and that is used in the pricing of risky

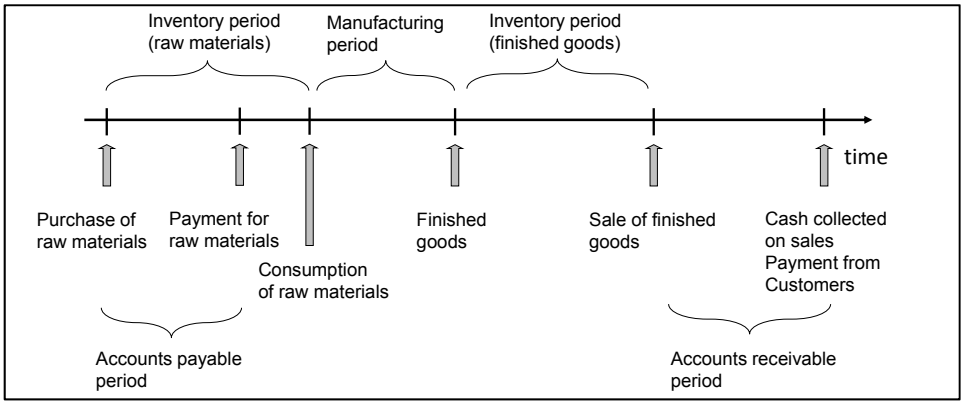
securities. The calculation of EVA for one period requires an amount of NWC that reflects the average amount of net investment in working capital components over the period.

3. Fundamental Working Capital Management Policies and their impact on NWC

According to the literature working capital management generally aims at minimizing NWC, or, in other words, the cash conversion cycle [Alexandre, Sasse, Weber 2004; Etiennot, Preve, Allende 2012; Payne 2002; Pfitzner, Hilbert 2014].

If the firm moves through the stages of the cycle of operations, as shown in Figure 4 below, the amount of raw materials required for production, given a fixed volume of production, is fixed. So actions that are undertaken in order to permanently reduce the capital bound in NWC need to shorten the time lag between purchasing raw materials and consuming them within the manufacturing process. In an analogous way, efforts of working capital management aim at reducing the work in progress inventory period as well as the finished goods inventory period.

Figure 4. Sequence of stages of the business process



The delay between purchasing raw materials and paying them is the accounts payable period, involving an implicit interest payment. Firms try to delay payment as much as possible in order to extend the accounts payable period, and to minimize NWC. This, in turn, minimizes cash conversion cycle. Since for calculating NWC the amount of accounts payable is deducted from the amounts of inventory plus accounts receivable, a situation in which NWC becomes negative can occur, indicating that parts of short-term capital are devoted to the financing of long-term assets.

Finally, if customers are offered to purchase goods or services with terms of credit, the resulting delay between the selling and the payment date creates accounts receivable. A firm's credit policy does not only include an implicit interest payment, but also involves the issue of credit risk. As in the case of inventory, the required capital to finance the delay between production and sale lead to an increase in NWC. It is important to realize that an increase in NWC may be the result of various situations since NWC is a compound variable, involving assets as well as liabilities.

Figure 5. Distinguishable patterns of interaction between NWC and its components

Δ (/) = Δ	$\Rightarrow$	Δ = 0
$+\Delta$ (/)	$\Rightarrow$	$+\Delta$
$-\Delta$	$\Rightarrow$	$+\Delta$
$+\Delta$ (/) $-\Delta$	$\Rightarrow$	$+\Delta$
$+\Delta$ (/) $+\Delta$, with: $+\Delta$ (/) > $+\Delta$	$\Rightarrow$	$+\Delta$
$-\Delta$ (/) $-\Delta$, with: $-\Delta$ (/) > $-\Delta$	$\Rightarrow$	$+\Delta$
$-\Delta$ (/)	$\Rightarrow$	$-\Delta$
$+\Delta$	$\Rightarrow$	$-\Delta$
$-\Delta$ (/) $+\Delta$	$\Rightarrow$	$-\Delta$
$-\Delta$ (/) $-\Delta$, with: $-\Delta$ (/) < $-\Delta$	$\Rightarrow$	$-\Delta$
$+\Delta$ (/) $+\Delta$, with $-\Delta$ (/) < $-\Delta$	$\Rightarrow$	$-\Delta$

The same logic applies to the case of a decrease or the case of NWC remaining constant. Figure 5 shows the multitude of combinations of measures taken that alter a single or more NWC-components in order to alter the total amount of NWC. Figure 5 distinguishes between combinations that lead to an increase in NWC, or to a decrease in NWC, or to a situation that leaves NWC unaffected.

This is important because it is not a change in NWC as a compound that influences EVA, but every single component affects EVA. More than this, the impacts of the respective components are manifold. The following figure will demonstrate this phenomenon. It demonstrates that one the one hand an increase of NWC may be achieved by at least five different configurations all of which are combinations of changes in single or all NWC elements.

4. Explaining changes in EVA based on changes in NWC: inventory management as an example

While traditional working capital management considerations focus on its consequences on the firm's cash flow, analyses in a context of value based management dependencies and implications are not that simple due to a more complex performance concept. So it is necessary to analyze the potential impact of changes in NWC on the variables that determine EVA. Based on the stages of the business cycle, the relationship between the individual components of NWC and EVA is analyzed. The analysis is conducted under the ceteris paribus condition, which means that possible reasons for a change in EVA other than those that result from a change in NWC, like for instance additional investments in fixed assets, are not part of the considerations.

Inventory Management can be seen as an important subfield of working capital management. It involves inventories of raw materials as well as work in progress and finished goods. A decrease in NWC, induced by a decrease in the capital invested in inventories over the period[4], reduces invested capital and, therefore, according to the structure of the value driver tree c. p. leads to an EVA improvement, due to a decrease in cost of capital. The chain of effects appears to be very simple. But this result, however, cannot be more than a preliminary and superficial statement regarding the impact of a reduction of NWC on EVA, based on the simple logic of financial accounting procedures and the arithmetic of the EVA formula: The decrease in the amount of inventories frees capital that was previously tied up in inventories. So there are potential indirect consequences of a decrease in inventory which need to be taken into consideration.

[4] This might be the consequence of e.g. just-in-time procurement and/or production on demand.

If the decrease in inventories is communicated to capital markets as a long term strategy by means of investor relations, this information might alter the expectations and the risk assessment of capital markets. As a consequence, the amount of equity beta, representing the business risk and the financial risk perceived by capital markets[5], might rise due to an increase in risk which might result from expected unfavorable reactions of customers and suppliers. Customers for example might fear a higher risk that the firm could be unable to deliver products on time and place their orders elsewhere. Suppliers, delivering raw materials on credit, might alter their terms of payment.

So according to formula (2), representing the capital asset pricing model, and assuming that capital markets immediately react to new information by adapting their risk assessment, cost of equity might rise:

$$\mu_{equity} = r_f + (\mu_{market} - r_f) * \beta_{equity} \tag{2}$$

with:

μ_{equity} – cost of equity, i.e. expected rate of return of a company's shareholders,
r_f – riskless interest rate,
μ_{market} – expected rate of return on the market portfolio,
β_{equity} – measure of systematic risk of shareholders' equity.

If, on the other hand, capital markets believe that reducing the amount of inventories will be a successful strategy, business risk might as well go down.

Whether the amount of capital untied by the decrease in inventory is used for payments to creditors or paying dividends to shareholders influences the firm's debt-to-equity-ratio. A change in the debt-to-equity-ratio as such does not alter the firm's business risk but its financial risk. So if the firm's debt-to-equity--ratio increases (decreases) according to formula (3) there is an increase (decrease) in the cost of equity:

$$\mu_{equity} = \mu_{unlevered} + (\mu_{unlevered} - \mu_{liabilities}) * (1 - Taxrate) * \frac{liabilities}{equity} \tag{3}$$

with:

$\mu_{unlevered}$ – expected rate of return on an investment in an unlevered, i.e. debtless company,
$\mu_{liabilities}$ – expected rate of return of a company's lenders.

The cost of debt depends on the firm's risk to default on debt which is the potential inability of a firm to fulfill its financial obligations on time. There is no

[5] Business risk is the risk resulting from the firm's operations with no debt outstanding. Financial risk is the risk to shareholders resulting from the use of debt.

general rule that describes to which extent the cost of debt is influenced by a change in the firm's debt-equity-ratio. Relevant factors are the existence of collateral and the term structure of debt. For the purpose of simplification it may be assumed that due to the existence of collateral, the cost of debt does not depend on debt-to--equity-ratio.

Taking into account the impact of the tax shield, WACC is calculated according to formula (4) showing that WACC depends on the cost of equity, the cost of debt, and the capital structure:

$$WACC = \mu_{equity} * \frac{equity}{equity+liabilities} + \mu_{liabilities} * (1 - taxrate) * \frac{liabilities}{equity+liabilities} \quad (4)$$

Since whether cost of equity increases or not is uncertain, and whether debt--to-equity-ratio increases or decreases is uncertain as well, the resulting impact of a decrease in inventories on WACC remains uncertain.

NOPAT might be influenced by the so called working capital trade-off: Carrying costs on the one hand, e.g. storage costs, will decrease so that NOPAT c. p. will increase, while on the other hand costs incurred from shortage in inventories (including opportunity cost due to a potential drop in sales) c. p. might lead to a decrease in NOPAT. This decrease in NOPAT then corresponds to a higher business risk as described above. So there is a permanent conflict between overinvestment and underinvestment in inventories [Meyer 2007, p. 103].

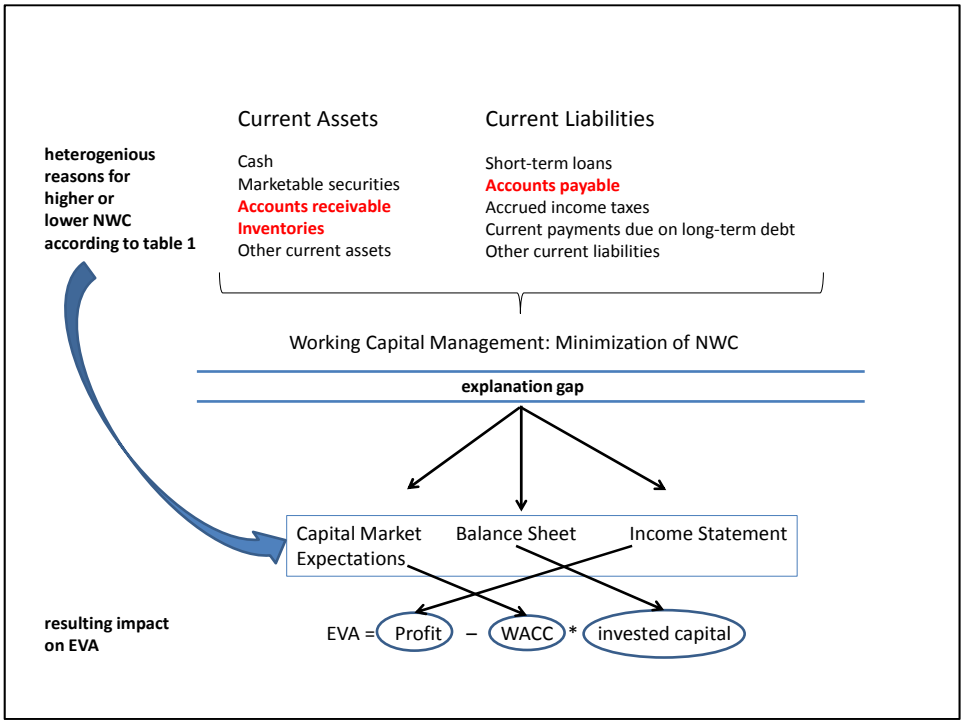
Since suppliers as well as customers might react to the information regarding the firm's new inventory management strategy, management might be forced to support sales by extending the credit terms, i.e. the accounts receivable period. Suppliers, as mentioned above, might wish to tighten their credit policy. As a consequence, it cannot be assumed to be certain that NWC as a whole and invested capital will go down.

So the originally maintained benefit from reducing inventory in terms of an EVA increase might easily be offset by the indirect implications described above. There is no systematic pattern of how EVA is affected by inventory management, and there is no guarantee that reduced investment in inventories will result in an improvement of a firm's performance measured by EVA. The variables that determine EVA are highly interdependent. A prediction of the direction and the amount of the influence of inventory management on EVA, based on the simple pattern of the value driver tree, is not possible. The impact of NWC on EVA is, for a large part, a result of the way capital markets, customers, and suppliers react to the signals sent by the firm.

The result of these considerations is the discovery of an 'explanation gap': A higher or lower EVA at a given moment cannot be explained by a higher or lower amount of NWC. More than this, whether a strategy to minimize the

amount of inventories leads to a decrease in NWC is doubtful due to uncertain reactions of business partners. So, in turn, it seems impossible to predict a change in EVA as a result of a change in NWC or one of its components which is the commonly used pre-assumption of financial target setting systems.

Figure 6. Explanation gap



Similar considerations suggest that management of accounts receivable in the sense of a reduction of accounts receivable is supposed to increase EVA. Also in this case, the resulting impact on EVA remains uncertain.

Extending the accounts payable period as a strategy to decrease NWC, e.g. due to a negotiated change in the terms of purchase, c.p. will lead to a decrease in invested capital, and eventually, a decrease in debt-equity-ratio if the additional amount of accounts payable is used to pay back liabilities other than accounts payable. The result is an increase in WACC. If instead the additional cash is used to pay back equity or to pay dividends to shareholders the consequences regarding debt-equity-ratio are uncertain. Again, there are contradictory implications for EVA.

Conclusions

As a consequence from the above considerations, it is not possible to identify generic rules regarding the way EVA_t (EVA expected for the first future period) is affected by measures that aim at minimization of NWC on the different stages of the business cycle. There is no general rule that an increase in NWC necessarily results in an increase in EVA. Also a decrease in NWC does not necessarily result in an increase in EVA. Working Capital Management, reduced to minimization of NWC, necessarily neglects the potential impact of influencing factors beyond the scope of NWC. It also neglects the potential interaction between these factors.

So far the focus was on potential implications of a change of NWC on expected EVA for the first future period. However, in a multi-period context the analysis becomes more complex since a prediction of all future EVA consequences of a present change in NWC is required in order to measure the resulting impact on shareholder value. This is because in a multi-period context, one has to be aware of the fact that EVA does not measure an increase or a decrease of shareholders' wealth[6]. More than this, all future changes in NWC need to anticipated.

One of the original questions raised in this paper was to which extent working capital management can serve as a useful tool to create or increase value, or, in other words, whether NWC can be seen as a value driver and therefore as a useful KPI. The above analysis has shown that it is impossible to identify a generalized scheme describing the impact of a change in NWC on EVA of the current and future periods. So there is no possible way to predict how working capital management contributes to an increase in shareholder value. The separate components of NWC are integrated in the EVA-calculation scheme. The attempt to disaggregate EVA to a 'NWC-related EVA' and a 'residual EVA' must fail. In addition to this, chances to actively manage NWC are limited: An increase in NWC might be an unavoidable result of a strategic investment.

On the one hand minimization of NWC is a routine based action, often neglecting the relevance of NWC for EVA [Kroflin, Kratz 2015]. On the other hand, measures taken by management in order to reduce NWC might not result in an increase in shareholder value in all cases. So applying NWC as a KPI is questionable. So is the creation of an incentive scheme that ties management compensation to NWC reduction.

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[6] For detailed information regarding so called Market Value Added (MVA) and how it interacts with measurement of shareholder value see [Ewert, Wagenhofer 2011, pp. 539-541].

Further research, focusing on potential levers for EVA increase accessible to managers could complete this research by delivering adequate KPIs which could replace existing rather routinely employed measures by more precisely predictable, action oriented ratios for EVA driven organizations.

References:

Alexandre P., Sasse A., Weber K. (2004): *Steigerung der Kapitaleffizienz durch Investitions- und Working Capital Management*. "Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung", Vol. 16, Iss. 3, pp. 125-131.

Copeland T., Goedhart M., Wessels D. (2005): *Valuation. Measuring and Managing the Value of Companies*. McKinsey, Hoboken, New Jersey.

Ewert R., Wagenhofer A. (2008): *Interne Unternehmensrechnung*. Springer, Berlin--Heidelberg.

Etiennot H., Preve L.A., Allende V.S. (2012): *Working Capital Management: An Exploratory Study*. "Journal of Applied Finance", pp. 162-175.

Kroflin P., Kratz N. (2015): *Working Capital Management as a Routine: An Action Based Access to the Topic*. "Business Economic Horizons", Vol. 11, Iss. 3, pp. 172-182.

Meyer C.A. (2007): *Working Capital und Unternehmenswert – Eine Analyse zum Management der Forderungen und Verbindlichkeiten aus Lieferungen und Leistungen*. Deutscher Universitätsverlag, Göttingen.

Pfitzner M., Hilbert A. (2014): *Anforderungen an ein analytisches Working Capital Management*. "Corporate Finance", Vol. 1, pp. 33-39.

Payne S. (2002): *Working Capital Optimization Can Yield Real Gains*. "Financial Executive", Vol. 18, Iss. 6, pp. 40-42.

Sasse A., Weber K. (2004): *Working-Capital-Management zur Steigerung der Kapitaleffizienz*. "Der Controlling Berater", Vol. 6, pp. 811-826.