RAVE™: Integrated Value Management for Customer, Human, Supplier and Invested Capital

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RAVE™: Integrated Value Management for Customer, Human, Supplier and Invested Capital

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Many companies have introduced new value-based methods such as the EVA™ or CVA concept for strategic and operational control. However, these concepts are still strongly focused on investment capital and can hardly explain and manage value creation in today’s service and knowledge economy. This article presents a new, integrated value management concept (RAVE™) for managing human capital (Workonomics™), customer capital (Custonomics™), and supplier capital (Supplynomics), all in a value-oriented and quantitative way. All of these concepts are anchored in CVA/EVA and thus culminate in the same central controlling metric. After outlining the concept, the authors illustrate its application and practical benefits with specific examples. © 2002 Published by Elsevier Science Ltd.

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Introduction

In 1494, an Italian monk named Luca Pacioli published an overview of the mathematics of his time. His work contains 36 chapters that describe what has since become standard knowledge among the world’s economists and business people: double-entry bookkeeping. Ever since the birth of balance sheet accounting, invested capital has been the center of every company and the reference point for the most important controlling metrics. It is hardly an exaggeration to say that the methods by which managers control their companies have essentially not changed for 500 years. In business controlling systems, at least, there is as yet no evidence of the passage from the industrial age to the information age.

But this is exactly where completely different factors come into focus. What counts today, more than capital and manufacturing plants, is access to customers and to employee know-how. These new sources of value creation play no role in the widely used capital-oriented business controlling metrics such as ROI (return on investment) or EVA™ (economic value added) and CVA (cash value added). The ‘balanced scorecard’ method does not solve the dilemma either. It provides new metrics on the human resources and customer levels, but they are often isolated, quantitatively linked neither among themselves nor with the main financial metric of the company.

The consequence: neither managers nor controllers
are in a position to competently determine how company value should be managed. This hurts both the quality of strategic decisions and the ability to adequately measure company performance.

In the following pages, we introduce RAVE™ (Real Asset Value Enhancer), a new approach to value management that allows the quantitative management of human, customer, and supplier capital. It supplements classic capital-based value management with these three perspectives, thus bringing together value management and the balanced scorecard in one integrated concept. The result is truly balanced value management.

Classic Value Management

After years of using static return measures, such as return on capital (ROC) or return on equity (ROE), many businesses today have traded them in for new, value-oriented measures of success. Besides the discounted cash flow method, the residual income methods such as Stern and Stewart’s EVA concept and The Boston Consulting Group’s CVA concept are the most widely known and used. Whereas static return metrics such as return on investment (ROI) measure only the efficiency of company units, value-oriented residual income metrics also take profitable growth into account as an essential source of value creation.

Residual income (EVA/CVA) is here defined as income over and above the cost of capital as determined by the capital markets.

\[
\text{Residual income} = \text{profit} - \text{cost of capital} \times \text{invested capital} = (\text{ROI} - \text{WACC}) \times \text{IC}
\]

A positive result is not enough: from the shareholder perspective, return on investment (ROI, which is profit divided by invested capital) must exceed the cost of capital (WACC, which is the weighted average cost of capital). If it does not, the shareholders can invest in other businesses that guarantee coverage of capital cost. Only that which is over and above the cost of capital is real residual income and a contribution to value creation.

In the simplest form of the EVA concept, profit is defined as NOPAT (net operating profit after tax), and invested capital is calculated at book value. Since ratios depend on the depreciation method and the age of the assets, both return on investment and EVA increase over time, all else being equal, even if operational performance does not change. CVA corrects this error. The metric for return on investment in CVA is CFROI (cash flow return on investment), and invested capital is valued at historical prices.

The value of a company can be calculated by discounting future CVAs or EVAs and adding the invested capital at t0. Therefore, EVA and CVA are compatible with discounted cash flow (DCF) computations.

What are the options for raising value in the EVA/CVA world, to attain a positive delta CVA/EVA between two periods? As shown in Fig. 1, they are:

- improved return on investment (ROI)
- profitable investment growth (IC), i.e., growth with ROI over and above the weighted average cost of capital (WACC).

The variables in the residual income definitions (CVA and EVA) refer to invested capital (return on investment, weighted average cost of capital, invested capital), and are used to measure and manage capital, for example, for capital allocation. The essential levers for raising value, such as improvement in return on investment and profitable capital growth, are also oriented purely to invested capital. Therefore, this perspective is called the capital view. Here, customers, employees, and suppliers are not factored in explicitly.

RAVE (Real Asset Value Enhancer)

The basic idea behind the new value management concept RAVE is to focus the management of the company on the dominant asset. The main levers for raising EVA/CVA, and thus total shareholder return, are found less and less in the optimization of classic investment capital.

Fig. 2 shows that even in classic industrial companies, capital-related costs—that is, depreciation and the cost of capital—no longer play the dominant role.

![Figure 1 Options for Increasing Value in Classic Value Management (Capital view)](image-url)

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image of the classic capital-based world, to manage human capital with the Workonomics approach, customer capital with the Customeronomics approach, and supplier capital with the Supplieronomics approach, all in a value-oriented and quantitative way. All of these concepts are anchored in CVA/EVA, and thus culminate in the same central controlling metric. In the following pages, we will first introduce the central metrics of these approaches. We will then use Customeronomics to demonstrate their application and use in business practice.

**Workonomics**

The goal of Workonomics is to bring a level of transparency and structure to the human factor that is comparable to the one brought by capital-based systems to investment capital. The Workonomics system provides a complete set of simple, quantitative, personnel-oriented metrics, forming a 'mirror image' of classic controlling and financial ratios.

EVA or CVA can be expressed solely with three metrics relevant to human resources (cf. Fig. 3).

- **Value added per person (VAP):** This is the average value added of the employees. Value added is here somewhat more broadly defined than usual (revenues—material expenses). Here employees must generate the depreciation and the cost of capital for invested capital as well (see footnote 12 for the exact definition). The broader definition is essential, because otherwise, if investments are substituted for employees, the value added per person (VAP) always rises (even if the substitution is inefficient). Value added per person can be interpreted as employees' productivity.
- **Average cost per person (ACP):** This is the average personnel cost per employee.
- **Number of employees (P):** is the total number of people employed.

![Figure 2 Cost Structures of Industrial, Trading, and Service Companies](image)

For trading companies, the cost of materials is often the largest cost block and personnel costs are second. For service companies personnel costs are the largest cost element. Therefore, for trading companies, the choice of products, management of suppliers, and control of material costs are the decisive levers. For service companies, personnel is most significant, i.e., value levers on the HR side must be identified and managed. The efficiency of investment capital, e.g., inventory reach, plant productivity, and so on, plays only a secondary role. These three input factors—materials, personnel, and capital—are juxtaposed with one output factor, the customer. Even though the company does not own the customers, we can still refer to them as customer capital. Especially in companies with high marketing and sales costs for acquisition and customer retention, the management of this fourth capital dimension is crucial.

Besides their special importance in cost structures, the relevance of human, supplier, and customer capital is determined by their availability and their contribution to company success. Whereas for most convincing business models there is an almost unlimited supply of investment capital from the capital markets, qualified personnel, qualified suppliers, and access to profitable customers are often scarce. Thus it is the quality of these factors—not the invested capital—that essentially determines the value-creation potential of today's companies.

The decisive difference here from the traditional view is the migration of cost positions—cost of capital, personnel costs, materials costs, and customer-related costs—into capital positions, namely, investment capital, human capital, supplier capital, and customer capital. Costs should be minimized, but capital should be developed. The assets that are slumbering in the right people, in customers, or in suppliers, must be consciously sought and managed.

The objective of the RAVE concept is to create an integrated controlling system that provides a mirror
EVA or CVA is positive if the value added per person (VAP) is higher than the average cost per person (ACP). This perspective is called the human resources view.

The common anchor for the capital and the human resources views is EVA or CVA. The form of the equations in both views is the same, so that direct analogies and correspondences can be made (cf. Fig. 3).

The weighted average cost of capital (WACC) corresponds to the average cost per person (ACP), i.e., the cost of human resources takes the place of cost of capital. The return on investment (ROI) is analogous to the value added per person (VAP), so rather than return on capital employed, we have return on people employed. Invested capital (IC) is analogous to the number of people (P), i.e., the use of resources in the capital view is reflected by the use of resources in the human resources view. Thus the balance sheet in the capital view becomes, in the human resources view, a sort of human balance sheet. Two measures of efficiency are defined, the return on investment (ROI) for capital employed, and value added per person (VAP) for people employed. The two growth measures are invested capital (IC) and the number of people (P). In this way, capital and employees, as essential company resources, are put on an equal footing and integrated in a single value management approach.

How can value be increased in the Workonomics view—that is, how can a positive ΔEVA or ΔCVA be achieved? Here, too, the analogy with classic value management holds.13

Value can be increased in the following ways (cf. Fig. 4):

- Improvement of the value added per person (VAP). Actions here are price increases, material cost reductions, process improvements, etc. The VAP is also the central target metric for actions such as training, recruiting, etc., thereby explicitly revealing the significance of human resources management.
- Another possibility for increasing value is profitable growth of the employed people (P), i.e., growth in the number of people with value added per person (VAP) above the average cost per person (ACP). In other words, employees should be added in businesses with VAP's higher than their ACPs. Here, measures are the hiring of employees whose potential value added is higher than their personnel costs. This brings in a whole new dimension of value creation, namely the explicit lever of profitable employment growth. Shareholder value and employment growth are thus not opposites. Rather, profitable employment growth, i.e., growth with VAP > ACP, leads to an increase in value. Since increased employment creates value only if VAP > ACP, the connections between productivity, wage level, and employment level are made directly clear. If VAP is lower than ACP in certain company units, cutting staff increases shareholder value, as unproductive employees are value destroyers.
- Finally, reducing personnel costs (ACP) also increases value. Measures here include, for example, moving production to lower wage locations or, from a macroeconomic standpoint, reducing non-wage labor costs. In addition, linking ACP to VAP can lead to new, variable compensation models.

Workonomics metrics can be calculated as averages for companies or company units, thus opening new, additional perspectives on value generation.

As can be seen in the example in Fig. 5, the capital efficiency of a large software manufacturer, measured by ROI, rose considerably in the observed period, but employee efficiency decreased. How can this be explained?

The company had grown strongly, due less to capital investment than to intensive expansion of the employee base. The simultaneously rising profit led to an increase in return on investment (ROI), as the
capital base changed only slightly. But measured on the employees, the increase of the profit was lower than the growth of the employee base, which became evident in sinking VAP. Strong growth came with losses in productivity, an effect not revealed by the classic capital view.

Analogous to classic performance figures, Workonomics metrics can also be used for benchmarking the company and business units internally or for benchmarking the entire company externally. Fig. 6 compares Europe’s largest retail chains on Workonomics metrics. The significance of the human resources perspective for these companies is underscored by the fact that personnel costs are often three to four times higher than capital-related costs.

But the most important application of Workonomics—and of the other components of the RAVE concept—is in its function as an integrated internal management and controlling tool. This is explained in more detail later.

**Custonomics**

In the Custonomics perspective, customer capital moves into the foreground. CVA or EVA is expressed solely with metrics relevant to customers, rather than with capital or human resources metrics. CVA or EVA can be expressed as the difference between value added per customer (VAC) and the sales and

<table>
<thead>
<tr>
<th>European retailers</th>
<th>EVA per person (K€)</th>
<th>VAP (K€)</th>
<th>ACP (K€)</th>
<th>Personal costs: capital-related costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sainsbury</td>
<td>5</td>
<td>33</td>
<td>28</td>
<td>3:1</td>
</tr>
<tr>
<td>Tesco</td>
<td>5</td>
<td>26</td>
<td>21</td>
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<td>Safeway (UK)</td>
<td>4</td>
<td>27</td>
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<td>Laurus</td>
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<td>Asda Group</td>
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<td>Carrefour</td>
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<td>Royal Ahold</td>
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<td>Delhaize Group</td>
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<td>21</td>
<td>19</td>
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<td>Douglas Group</td>
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<td>Hornbach Holding</td>
<td>1</td>
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<tr>
<td>Ava</td>
<td>1</td>
<td>22</td>
<td>31</td>
<td>7:1</td>
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<tr>
<td>Groupe Casino</td>
<td>0</td>
<td>20</td>
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<td>2:1</td>
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<tr>
<td>Karstadt Quelle</td>
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<td>4:1</td>
</tr>
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<td>Sinn Leffers</td>
<td>-2</td>
<td>34</td>
<td>36</td>
<td>3:1</td>
</tr>
</tbody>
</table>

**Figure 6** Benchmarking European Retailers on Workonomics Metrics
marketing costs per customer (ACC), multiplied by
the number of customers (C).\textsuperscript{14} Since here, too, CVA
or EVA is the common anchor, and the form of the
equations is identical, analogies and correspondences
similar to those in the Workonomics perspective can be
drawn (cf. Fig. 7).

In this view, value can be created (positive $\Delta$CVA or
$\Delta$EVA) by increasing the value added per customer
(VAC) (such as by cross-selling, for example), by low-
ering sales and marketing costs (ACC) (with mea-
sures such as making sales costs variable or effective
media selection), or by profitably growing the cus-
tomer base (C) (such as with special customer reten-
tion or acquisition programs).

With this, we have an appropriate quantitative con-
trolling instrument for numerous customer-oriented
companies (e.g., Internet companies, retailers, tele-
communications firms, insurers, banks). The concept
can be used for managing companies, company units,
customer segments and sales locations, and even, in
extreme cases, to guide the decisions of individual
members of the sales staff. Custonomics is more than
a pure controlling tool, because it brings up many
strategic questions in the process of customer analy-
sis and segmentation.

**Suppynomics**

Besides the human resources view and the customer
view, there is a third decisive view, the supplier
view.\textsuperscript{15} The corresponding value management
concept is called Suppynomics.\textsuperscript{16} (See Fig. 8)

Here, the measure of efficiency is the value added
per supplier (VAS), which is juxtaposed with the
average cost per supplier (ACS). The growth metric
is given in the number of suppliers (S).\textsuperscript{17}

In the Suppynomics concept, suppliers can also be
replaced by products or product groups (supplies).
This leads to a value-oriented, product specific con-
tribution margin calculation. Suppynomics therefore
enables the contribution margin calculation used in
many companies to be linked to the central con-
trolling metric CVA or EVA, and thus its integration
into a value-oriented controlling system.

Value can be created by increasing the value added
per supply/supplier, such as with product-group-
specific pricing, internal efficiency increases, or the
expansion of sales per supply/supplier; by lowering
the average cost per supply/supplier, such as by low-
ering supplier-specific costs like logistics costs,
warehousing costs, and direct purchasing prices; or
by expanding the supply/supplier base S (assuming
that the value added per supply/supplier is more
than the average cost per supply/supplier), (see
Fig. 8).

Suppynomics therefore facilitates company-wide
assessment and benchmarking of the value contri-
buted by individual suppliers, products, and product
groups. It is particularly suitable for companies with
little vertical integration, such as retailers or con-
sumer goods companies, in which the value added of
individual products or suppliers can be determined.

### RAVE\textsuperscript{TM} as a Management Tool

The application and the practical benefits of the
RAVE concept for strategic and operational manage-
ment are described more closely below, using the Customomics concept as an example. Two levels can be distinguished. On the one hand, the new metrics complement or substitute traditional, capital-based financial metrics for the management of company capital (in the expanded definition). On the other hand, these newly defined top-level controlling metrics can serve as a starting point for a differentiated operational control system that identifies and quantifies operational value drivers for managing supplier, customer, and human capital.

The following considerations can be similarly applied with the Workonomics and Supplynomics concepts.

Financial Control

Like classic capital-based value management, the Customomics metrics VAC, ACC, and C can be used for controlling entire companies or individual company units (subsidiaries, business units, product segments, customer segments, etc.). Observed *ex post*, they serve to evaluate the rate of success; *ex ante*, they can be used to make decisions about the allocation of resources.

Since overall company value can be expressed as discounted future EVAs or CVAs, target values for future CVAs or EVAs can be derived from desired market value generation (the difference between current and target market value\(^\dagger\)). These target values then can be divided into target VACs, ACCs, and number of customers (Cs). In contrast to the capital-oriented world, target values for the customer-related metrics VAC and C (aspired growth of the customer base) are considerably more transparent and logical for many customer-oriented businesses (e.g., Internet companies, telecommunication firms, retailers, insurers, banks) than are objectives related to the growth of invested capital and return on investment.

As both classic value management and the new RAVE metrics flow into CVA or EVA, the two systems can also be used in parallel. This makes it significantly easier to implement them. Classic financial ratios must not be renounced, but can be retained as a complementary perspective. The compatibility of these perspectives, due to their anchoring in CVA or EVA, is particularly beneficial for corporate groups with varied business units. Units high in human resources, such as advising or service units, can be controlled with Workonomics, while Customomics can be applied to customer-driven units, and Supplynomics to supplier-dependent units. Finally, investment-intensive units can be controlled with classic capital-based financial ratios.

The benefits and application of top-level Customomics metrics are illustrated in the following example. In Fig. 9, the Customomics metrics of a catalogue company with more than 100,000 customers are differentiated by the countries\(^\dagger\) in which the company is active. Especially in EVA per customer, which is analogous to the difference between VAC and ACC, there is considerable variation.

A correlation between VAC and ACC cannot be observed, i.e., in the places where numerous sales and marketing activities per customer are carried out (ACC), high earnings per customer (VAC) do not automatically result.

Furthermore, the ranking of the countries by VAC minus ACC is completely different from the ranking
by the difference between return on investment (ROI) and weighted average cost of capital (WACC) (Fig. 10). In other words, a new benchmarking perspective has been opened. Switzerland’s ROI of 96%, for example, shows the limited validity of the traditional capital perspective. Even the smallest change in capital base (the ROI denominator), results in enormous fluctuations in ROI, which makes good management with traditional capital-based metrics impossible.

**Operational Control: Value Driver Analysis**

To discover the reasons for the differences in top-level Custonomics metrics, a differentiated analysis of the underlying value drivers is necessary. The goal is to identify the value drivers most relevant to the metrics VAC, ACC, and C, which then should be made the focus of operational company management. As we will see, the relevance of a value driver depends on both how sensitively the VAC, ACC, or C reacts to changes in it, and on the degree to which the value driver in question can be influenced by the company.

A value driver analysis consists of five steps (Fig. 11).

After a brief assessment of available metrics, the new metrics VAC, ACC, and C can be calculated as described above for various customer segments, sales offices, and countries. Then, in the third step, these ratios can be further broken down into value driver trees. For instance, the total number of customers is made up of the number of new customers and of current customers, and the value of these various segments can be influenced by different metrics (Fig. 12).

Reactivation, cancellation, and response rates are thus brought to bear as operational value drivers. This logic can be applied in the same way for VAC and ACC.

Since the value driver trees are completely quantitat-
Figure 11 Steps of Value Driver Analysis

Figure 12 Example of Value Driver Tree

Figure 13 The Ten Top Value Levers with Corresponding EVA Potential
ively linked, numerous (often more than a hundred) value levers can be prioritized. This is done in two steps. First, every value lever is individually changed by the same percentage, and each time, the effect on EVA is measured. This sensitivity analysis gives an impression of the importance of the individual levers for value creation in the company.

But not all levers can be moved in the same way. Some can’t be moved at all, whereas others would move much more in a best-case scenario. Therefore, in the second step with members of management, the individual levers must be analyzed to determine how much they can be influenced. That is, for all value levers, the best-case upside potential and worst-case downside potential are determined for one- and five-year periods. This reveals the most important value levers. Fig. 13 shows the top value drivers for the catalogue company described above.

Using this sensitivity analysis and analysis of potential, one value lever, ‘X’, was identified that had by far the largest EVA potential. Just the activation of this lever doubled the catalogue company’s EVA.

In the sensitivity analysis shown here, the value levers were changed independently. In a fourth step, various scenarios can be simulated in which value levers are changed simultaneously. This makes it possible to recognize interdependencies. A price increase, for example, can bring about a reduction in volume, and an increase in volume can cause changes in all variable costs.

The best-case scenario shows the inherent value creation potential of the company, the country, or the sales location. Conversely, the worst-case scenario illuminates the downside risk. Also, for publicly listed companies, the target EVAs or CVAs derived from market data can be broken down and translated into concrete objectives for the top value levers.

Finally, in the fifth step, the results generated by the value lever analysis should be sustainably secured and implemented. To this end, the objectives can be listed on a scorecard and backed up with concrete actions and clear responsibilities. A Customomics cockpit is recommended for management (Fig. 14).

With the use of this graphic tool, Customomics metrics and the corresponding top value levers can be controlled or managed with benchmarks for countries, branch offices, or customer segments. In the rectangles in the graph, the worst branch office (worst case) is on the left and the best one (best case) is on the right, and the branch offices under consideration are marked light gray or dark gray. Dark gray means worse than average, light gray better than average. In the upper half of the cockpit, the Customomics ratios for the branch office are listed, and below them are the top value levers as determined in the sensitivity and potential analysis. All the relevant metrics are on the radar screen in a format that is ideally suited for overall sales management.

The same kind of value driver trees and cockpits can be built for the human resources and supplier views.

**Comparison with the Balanced Scorecard**

In the 1990s, Robert S. Kaplan and David P. Norton were the first to address the problem discussed here—the one-dimensionality of classic capital-based metrics systems—with the concept of the balanced scorecard. Here, traditional financial ratios are also complemented with other perspectives. Beyond the financial perspective, customer, internal business processes, and learning and growth perspectives are defined. These perspectives are centered on vision and strategy. Strategic goals are to be transformed into measures for each of the individual perspectives. Altogether, Kaplan and Norton propose about 20 measures for management to focus on, and for which cause and effect can be determined, thus forming a complete, comprehensive management system.

How does the balanced scorecard approach differ from the RAVE concept?

First, it must be noted that a direct comparison is difficult, since both concepts are always adjusted to specifically fit the company in question. According to Kaplan and Norton, the scorecard is to be seen as a guide, not a straitjacket, so that more or less all company metrics can be subsumed within it. Still, several structural differences can be observed which, in our opinion, point out the clear advantages of the RAVE concept.

We believe that one of the significant advantages of the RAVE concept is the systematic quantitative link to the main metric, which is consistently realized in the various perspectives. The correlation of cause and effect is indeed analyzed in the balanced scorecard approach, but the connections made are mostly qualitative.

Another disadvantage of the balanced scorecard is its inability to systematically select and prioritize metrics. A ranking of metrics by their influence on the main metric, e.g., through sensitivity analyses, is not possible. And since the metrics are often not systematically derived specifically for the company in question, the scorecard usually employs conventional metrics. Surprises usually do not occur. At the same time, due to the lack of a quantified connection to the main metric, no analytical interdependencies between metrics can be considered. This can result in incorrect interpretations while determining goals and actions. The fact that there is less emphasis on quant-
Figure 14 Custonomics Cockpit

Figure 15 Central Metrics of the New Integrated Value Management Approach RAVE™

Conclusion

In the RAVE concept, classic capital-based value management, with ratios like ROI and CFROI, is complemented with three crucial dimensions. Workonomics measures and controls human capital, Custonomics measures and controls customer capital, and Supplynomics measures and controls supplier capital. All three are anchored in a universal controlling metric, EVA or CVA (Fig. 15). Thus, the single-sided, capital-oriented controlling instruments employed at many companies are not replaced, but completed, with three important new dimensions. These dimensions reflect the real assets of most today's companies. Being more than a pure metric system, RAVE recognizes these assets as central sources of value creation and allows for a quantitative, value-oriented strategic and operational control of their value creation potential.

Notes

1. Also Siegert (2000), p. 24ff. argues that with the transformation from the industrial age to the service economy, accounting and controlling should have been extended by the 'customer capital' dimension, and that with the transformation to the knowledge economy, the 'human capital' dimension needs to be added as well.
2. EVA is a registered trademark of Stern Stewart & Co.
3. RAVE, Workonomics, and Custonomics are registered trademarks of The Boston Consulting Group.
10. RAVE, Workonomics, and Customomics are registered trademarks of The Boston Consulting Group.

11. RAVE, Workonomics, and Customomics are registered trademarks of The Boston Consulting Group.

12. Exact definitions in the CVA/EVA framework are: 
VAP = VA/P with VA = R-MC-D-WACC-CIC and ACC = SMC/C. Abbreviations: VA: [E]; value added; P: number of people (full-time equivalents); R: [E]; revenues; MC: [E]; material costs; IC: [E]; invested capital; D: [E]; depreciation; WACC: [E]; weighted average cost of capital. For a more comprehensive definition and derivation of the measures, see Strack/Villis (2001), pp. 70-75.


14. Exact definitions in the CVA/EVA framework are: 
VAC = VAC* / C with VAC = R-MC* + PC* - D* - WACC* - IC* and ACC = SMC/C. Abbreviations: VA*: [E]; value added; C: number of customers; R*: [E]; revenues; MC*: [E]; material costs; IC*: [E]; invested capital; PC*: [E]; personnel cost without sales and marketing share; D*: [E]; depreciation without sales and marketing share; WACC*: [E]; weighted average cost of capital; SMC*: [E]; sales and marketing costs. For a more comprehensive definition and derivation of the measures, see Strack/Villis (2001), pp. 76-77.

15. Besides Workonomics, Customomics, and Sapirophysics, other views may also be defined (e.g., value added per R&D project, cost per R&D project, number of R&D projects; or value added per brand, cost per brand, number of brands). For a comprehensive overview, see Strack/Villis (2001), pp. 76-77.

16. With the same meaning as Sapirophysics, the term Sapirophysics is also sometimes used for the supplier-oriented concept.

17. Exact definitions in the CVA/EVA framework are: 
VAC = VAC* / S with VAC = R-MC* + PC* - D* - WACC* - IC* and ACC = SMC/C. Abbreviations: VA*: [E]; value added; S: number of suppliers; R*: [E]; revenues; PC*: [E]; personnel cost without purchasing and fulfillment-related share; D*: [E]; depreciation without purchasing and fulfillment-related share; WACC*: [E]; weighted average cost of capital; IC*: [E]; invested capital without purchasing and fulfillment-related share; SMC*: [E]; material cost including purchasing and fulfillment-related cost.

19. Incl. target dividends.
20. Country is disguised.
21. Country names are disguised.
22. Usually, you would use red and green colors to indicate need for action.
24. In theory, Kaplan/Norton argue that a quantitative link should also be sought some time after the system is established. Cf. Kaplan/Norton (1996b), pp. 67-68. In practice, most companies know don’t go that far once the scorecard is in place. RAVE, on the other hand, requires right from the start a quantitatively linked model of the metrics.

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