



# Paradigm change in the rendering of accounts? The dynamic set of accounting figures, a dream?\*

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*Simulation plays an ever-increasingly central role for complex, future-oriented decisions. A really effective, value-oriented management control does not appear possible without the simulation of future business processes. The development of a set of accounting figures, directed towards the future, is required as a common challenge for the next few years by both research and practice. The realization of this revolutionary dream would open the prospect of until now unknown trend-setting possibilities for the application of knowledge management and business intelligence.*

*Already for some years there has been such a set of accounting figures. The approach is universally valid. The legitimacy of double-entry bookkeeping is mathematically transformed dynamically into the future using a computer algorithm, and that precisely. The set of accounting figures not only books actual values of the past but also global management planning specifications about the future of the business. It creates, over as many years as desired, high-quality rendering of accounts using prospective, integrated flow-of-funds analysis, the annual financial statement as well as a statement of loss and gain. The approach was published in a series of scientific works under the title "The input-output simulation of business processes"<sup>1</sup>.*

## 1. Introductory Remarks

Both the traditional rendering of accounts (whether according to HGB [German Commercial Code], IAS or US-GAAP)<sup>2</sup> as well as modern management information systems record, organize and analyze exclusively figures from the past. Even future-oriented extrapolations in the form of predictions and trend forecasts belong within this situation. If one speaks of knowledge management, then it is quite obvious one means the organization and productivity-increasing application of existing knowledge. Knowledge is by definition, however, related to the past. To what extent does a business really use such knowledge, so far as it is reflected in figures, for the assessment of the future development of a business? To what extent does knowledge of figures based on the past help analysts, the stock exchange, the shareholders? As everybody knows the figures of the past do not create shareholder value, rather the cash flows which result from the future planning by management.

Even inveterate balance sheet experts today question the future-oriented capability of the classical annual financial statement to produce meaningful information<sup>3</sup>. It was never directed towards the future. Nevertheless, it subtly receives lavish care with vast application of money and detailed professional knowledge in various forms. Not the least this is due to the dynamic rendering of accounts up to now not being

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<sup>1</sup> Dauner/Dauner-Lieb, Die Input-Output-Simulation von Unternehmensprozessen [The input-output simulation of business processes], BFuP 2/1996, p. 233-251 with further notes on relevant literature; Dauner/Dauner-Lieb, Prospektive Kapitalflussrechnung - ein Schlüssel zu Bilanzanalyse und Simulativer Unternehmensführung [Prospective flow of funds analysis - a key to statement analysis and simulative management], DStR 39/40/1996, p.1541-1544 and 1578-1584.

<sup>2</sup> According to Küting, balancing lags behind market assessment, Handelsblatt dated 26.4. 2001, p. 14, "the question arises, as to whether the traditional balance is still up to date. A conversion from the HGB to international rendering of accounts in accordance with IAS or US-GAAP can produce no remedies."

<sup>3</sup> Küting, Die deutsche Rechnungslegung wird dynamischer [German rendering of accounts becomes dynamic], FAZ dated.19.3.2001, p. 32: "... sooner or later the question arises whether the classic balance is, in every case, the suitable instrument for the determination of information about future potential for success."

\* **Translation** of the manuscript "Paradigmenwechsel in der Rechnungslegung? Das dynamische Rechenwerk, ein Traum?", abridged **German offprint "Simulative dynamische Rechnungslegung"**, article from the book: Knowledge Management und Business Intelligence, Springer-Verlag Berlin Heidelberg New York 2002.

known and, as this is unknown, it is not considered to be possible. Nevertheless, one suspected the flaw and attempted step by step to free oneself from the constraints of an inflexible, past-related rendering of accounts. Outstanding example is the volte-face in the treatment of goodwill under US-GAAP according to the latest decisions of the American standard setter, the FASB<sup>4</sup>. Whereas previously a scheduled ratable depreciation of the goodwill counted as an obligation, now only unscheduled depreciation is still to be carried out case by case<sup>5</sup>. With this, it is important that the focus is on the estimation of the future cash-flows of the so-called reporting units<sup>6</sup>. No matter how the balance sheet experts assess the new regulation for US-GAAP<sup>7</sup>, even then the conventional, predominantly past-related annual financial statement, as well as the

quarterly statement of accounts<sup>8</sup> so highly valued on the stock exchanges, is hardly suitable for future-oriented determination of information. As it is, a responsible estimation of the future cash-flow per reporting unit is, without the dynamic rendering of accounts as the technology of the Input-output Simulation offers, not possible<sup>9</sup>. Evidently, but nevertheless still insufficiently, a paradigm change in the direction of a dynamic rendering of accounts is at hand.

## 2. Dynamic rendering of accounts and simulation

Simulative business management as conception and management method has up until now found no entry into business practice. This, not the least, lies in the fact, that up until now there was no easily comprehensible simulation-model in practice which perfectly represented the business. It is true that the traditional, formalized annual financial statement is a complete, quantitatively and qualitatively clear-cut representation of the business. But as ever since its invention by Pacioli some 600 years ago, up to today it is employed exclusively for the representation of past periods of time. Already the name "financial statement" indicates the static character of the definition. It astonishes no one that, with this, the technique of double bookkeeping is understood only as static. Terms such as "dynamic" or even "simulative" have, until now, hardly fitted into this frame of mind.

The completely overwhelming results of the scientific work of input-output simulation<sup>10</sup> is, however, that the door to dynamic, simulative future thinking is in no way closed to double book-keeping. Quite the opposite, its mathematical basic structure of a homogeneous linear set of equations principally also allows full-value dynamic rendering of accounts over any future period of time which suits. If the computer algorithm which, using information technology, solves the set of equations is networked using suitable "simulation adapters" then, following input of arbitrary, unlinked variables, there results - almost timelessly - linked three-part annual statements of account (output) with integrated prospective flow of funds analysis,

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<sup>4</sup> Financial Accounting Standards Board

<sup>5</sup> Pejic/Buschhüter, Ende der planmäßigen Goodwill-Abschreibung? [End of scheduled goodwill depreciation?] - Overview of the standard draft of the FASB: Business Combinations and Intangible Assets-Accounting for Goodwill-, KoR, Zeitschrift für kapitalmarktorientierte Rechnungslegung [Journal for capital-oriented rendering of accounts], 5/6 /2001, p. 107-112.

<sup>6</sup> Pejic/Buschhüter, Fn. 5, p. 108: The reporting unit in ED 2001 is defined as "lowest level of a legal unit, which an individual business has and which can be differentiated physically, operatively as well as for the purposes of internal reporting of other activities, operations and assets of the legal unit." Through the introduction of reporting units "the criticism expressed in the foreground on the corporate side ... has largely been answered".

<sup>7</sup> "Analysts don't just look at the Cash-Flow, which will not change, but rather primarily at earnings ratios such as, for example at the profit per share, which moves dramatically upwards with an abolition of goodwill depreciation", Pellenz, in: Bilanzexperten kritisieren neue US-Goodwill-Regeln [Balance sheet experts criticize new US Goodwill Rules], Handelsblatt dated 3.7.2001, p. 16.

<sup>8</sup> Rappaport in an interview with dialogue and change, Magazin für moderne Unternehmensführung, 3/1998, p. 10: "One is not concerned with the result of the next quarter. The cashflow must permanently exceed the costs of the capital invested in the business."

<sup>9</sup> Küting, Weniger Transparenz bei Unternehmensbilanzen [Less transparency with business accounting], Handelsblatt dated 05.07.2001, p. 10: "...and in particular the estimation of the future cashflow ... introduces subjective discretionary decisions into the balancing of an account, which makes for scope in accounting policy".

<sup>10</sup> Dauner/Dauner-Lieb, Fn. 1.

annual financial statement as well as profit and loss calculation.<sup>11</sup> The unlinked input variables are none other than the internal decision and planning bases of the business management converted into material planning and assumption values.

It becomes immediately obvious, that material decision and planning quantities can only be thought of and defined globally. Almost infinitely many individual entries, as in retrospective accounting, make no sense for the prospective dynamic rendering of accounts. The dynamic rendering of accounts about the business future is therefore based on combinations of global quantities such as turnover, material expenses, number of employees, personnel costs/employee-year, other operating income and expenses, (dis)investment in new plant and equipment, injections of new own and outside capital, repayments of own and outside capital, average interest rates with regard to assets and liabilities, and also depreciation/amortisation and change of provisions. These can and must be combined variably. Dynamic rendering of accounts concerning the assumed business future, or that firmly planned at a certain point in time, is therefore simulative. The management performance targets (input) are also to be updated continuously to the permanently changing environment outside and within the business. The rendering of accounts (output) is then updated at regular intervals, more or less automatically, by pushing a button. While in the past-related rendering of accounts the continuous application of double-entry bookkeeping leads to the profit, to the amendment of the level of debt and of the equity capital, using the dynamic set of accounting figures of input-output simulation these quantities are calculated precisely in one run from simulatively “booked” global input values.

Simulative business management indicates directly the effect of selected scenario alternatives on the target values to be achieved. The following scenario alternatives are given as examples: aggressive or less aggressive sales policy, purchasing policy, reduction or expansion of the production depth, new investment together with reduction or increase in the number of employees, combination of production facilities for the realization of synergy effects, divestment for the reduction of indebtedness or for reasons of portfolio streamlining, determination of dividends with a view to the capital market, conservative or progressive balance policy, raising of equity capital. Fundamentally all decisions, which have to be made in business management, both short-term or long-term, can first be run-through simulatively. The actual decisions can then be made with the full knowledge of their later effects on the corporate process or on the prospective rendering of accounts respectively. The decision support, unlimited in factual content and passage of time, is extremely simple, rapid, real and cost-effective to use.

### 3. Dynamic rendering of accounts and reporting unit

For the concept of a simulative business management there is the important question as to whether one has to stick to a legally actually existing business with compulsory annual financial statement, or whether freely determined reporting units of a completely dynamic rendering of accounts are also open for application. The technique of input-output simulation allows this without limitation. From freely-fixed performance targets (turnover, material costs, number of employees, personnel costs/employee-year, other operational revenue and expenses, (dis)investment in new plant and equipment, injections of new own and outside capital, repayments of own and outside capital, average interest rates with regard to assets and to total equity and liabilities, and also depreciation and operating reserves etc.) there results respectively one self-contained reporting unit<sup>12</sup>, with its own prospective, integrated flow of funds analysis, annual financial statement as well as profit and loss calculation. With that the splitting up of the business into reporting units according to the new arrangements of the goodwill depreciation/amortisation in accordance with the US-GAAP does not, as the experts fear, become an activity<sup>13</sup> extremely expensive in time and cost but rather almost without problem. Instead of estimated cash-flows and their modifica-

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<sup>11</sup> Dauner/Dauner-Lieb, Fn. 1.

<sup>12</sup> See above Pejic/Buschhüter, Fn. 6

<sup>13</sup> Pejic/Buschhüter, Fn. 5, p. 111: “Hoards of bookkeepers and controllers will, over months, be loaded fully with the limitation of individual reporting units.”

tions<sup>14</sup>, the technique of input-output simulation calculates for each reporting unit, following input of the unlinked planning specifications, the corresponding flow of funds and the associated cash-flows<sup>15</sup>.

#### **4. Dynamic rendering of accounts and shareholder value**

The shareholder value method, as instrument for appreciation analysis draws upon discounted cash-flow (DCF) as yardstick for the appreciation<sup>16</sup>. If the value of a business is measured using this yardstick, there thus results quantitative comparison possibilities of concerns, individual businesses, and arbitrarily defined reporting units. The quality of a discounting of cash-flows depends on the closeness to reality of the cash-flows taken as a basis. As one is concerned with cash-flows in the future, these have to be estimated, predicted or, even better, calculated precisely. Through all statements of the supporters of the shareholder value approach, the opinion runs through like a red thread, that it only has sense if alternative future scenarios with quantifiable cash-flows and variable capital structures can be designed in a calculable fashion<sup>17</sup>.

The simulative rendering of accounts can do precisely this and that with the least expense in time and cost. Cash-flows result automatically from the addition of the individual elements of the prospective, integrated flow of funds analysis, which is the constitutive part of the respective simulated rendering of accounts. Varying outside capital costs are incurred in the form of interest rates to be specified with regard to interest bearing assets and interest bearing liabilities as well as own capital costs in the form of planned dividend payments in the simulation of future scenarios. There is much to be said for the fact that only a full-value dynamic rendering of accounts of the shareholder value method can provide a solid basis for planned scenario calculation (detailed estimation of business policies, strategies).

With that there opens up new perspectives for top management, executive board, day to day management, directors of finance and accounting matters, of controlling and, in particular, also directors of reporting units: the development of each business, concern or reporting unit can be considered in variants within an artificial "business cosmos". Decision alternatives can be compared directly and without delay in their respective effects on profit and loss, cash-flow and financial development. As all input and output values are saved automatically structured, standardized knowledge on the planned or even only assumed future of individual reporting units can be exchanged arbitrarily, even summarized and applied in a dynamic consolidated account. With the employment of the dynamic rendering of accounts (decentralized and/or centralized) a business or concern can respectively carry out a completely new quality of knowledge management and business intelligence.

#### **5. Dynamic rendering of accounts and data mining**

Dynamic rendering of accounts can only be understood as being simulative rendering of accounts within the framework of scenario technology. For each planned or even solely assumed scenario there is one single business process which is recorded in all details with one single rendering of accounts. Data mining is then an information technological process which, in a great number of possible scenarios, and thus in a great number of simulated business processes and full-value rendering of accounts, seeks previously laid down target values. Thus the statement of the problem is not what turnover in a certain country will probably be achieved in the next month and why. It is much more which combinations of planning targets are necessary and also sufficient in the actual corporate control in order to achieve certain target figures

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<sup>14</sup> Pejic/Buschhüter, Fn. 5, p. 109: In accordance with US-GAAP the following has to be laid down bindingly for the calculation of the individual goodwill amortization: "1. An estimation of future cash-flows; 2. An estimation of possible modifications with regard to the timely yield or the amount of the expected cash-flows ..."

<sup>15</sup> For this see also Chap. 4. Dynamic rendering of accounts and shareholder value

<sup>16</sup> Rappaport, Shareholder Value - Ein Handbuch für Manager und Investoren [A manual for managers and investors], 1999

<sup>17</sup> Comp. Bühner (Publisher), Der Shareholder-Value-Report, 1994

(profitability values of all types, productivity, cash-flows of various definitions, maximum net indebtedness etc.). The automatically functioning data mining algorithm of the input-output simulation seeks from the created rendering of accounts for the business future in each case the ones which achieve the laid down target values. As each individual rendering of accounts emerges from a certain combination of global control quantities, the target values are clearly assigned to these control quantities.

The benefit of the interplay of scenario techniques with data mining lies precisely in easing the decision-making for the businessman between the various theoretically feasible processes. The technique of the input-output simulation allows the collection of experience beforehand. It indicates possible undesirable developments long before these faulty developments become reality. Upcoming costly false positions can be detected simulatively beforehand. An irretrievable squandering of financial resources can be countered through timely decisions within the framework of future-oriented business intelligence.

## **6. Dynamic rendering of accounts and stock exchange**

Management reports and also quarterly reports from businesses embrace only elements which, in the stage of the financial statement, already belong to the past. Even analyses by stock market specialists derive the economic future of a business only from previously known data. (Profit-) predictions of the business themselves are not verifiable and thus not convincing. The development and introduction of a dynamic set of accounting figures oriented to the future therefore becomes ever more urgent.

Already in 1966 Busse von Colbe had proposed, from today's angle almost prophetically, the "introduction of a voluntary or statutory publication of a foresighted flow of funds analysis". "The stockholders received a medium-term financial plan with valuable information for the formation of their expectations on the future breadth and timely distribution of the flow of dividends and on the selling prices of their shares."<sup>18</sup> The input-output simulation delivers this set of accounting figures, which are aimed at the future. Their possibilities for employment go far beyond the proposed foresighted flow of funds analysis. The businesses listed on the stock exchange should fix their predictions in the form of firmly defined management planned performance targets. Using the dynamic set of accounting figures of input-output simulation these planned performance targets are converted, without problem, into a rendering of accounts which stretches out over several years. Instead of non-verifiable profit forecasts integrated within no precise rendering of accounts, high-quality financial statements, which are to be updated in firmly defined regular intervals over several years, would be made available with prospective payment-flow-oriented and automatically produced financial characteristic values, to the stock market. The predictions would be verifiable. From the traditional, characteristic value-oriented balance sheet analysis would come a highly effective dynamic, continuously updated corporate analysis.

Those interested, such as innovative-thinking stock market executive boards, employees of the SEC, journalists, bankers, analysts, certified public accountants, professors should consider whether they could be won over as potential "trend setters" for the voluntary or even obligatory introduction of dynamic rendering of accounts. Should firms be induced to publicize future-oriented rendering of accounts over several years, which are to be updated quarterly, the stock market would develop or would have developed much more rationally. Arbitrary planned studies "on the living object" (for example Intershop, T-Online, RWE)<sup>19</sup> show the way.

## **7. Dynamic rendering of accounts and certified public accountants**

With german KonTraG, certified public accountants have been allocated responsibilities by the legislator reaching well into the future. The examination tasks no longer extend only over elements which, in the

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<sup>18</sup> Busse von Colbe, Aufbau und Informationsgehalt von Kapitalflussrechnungen [Structure and information content of flow of funds analysis], ZfB 1966, p. 82, 114.

<sup>19</sup> www.asrap.com with numerous planned studies and case examples.

phase of examination, already belong to the past. In addition “controlling as a type of joint element of the information interests of organs of the firm and shareholders”<sup>20</sup> is part of this examination.

The question arises as to how far modern information technology can be useful in removing deficits in the supply of information of the organs of the firm. With employment of the set of accounting figures of the input-output simulation it becomes possible to represent in a dynamic rendering of accounts, the future of the firm as reflected in the planning and decision basis of management, without delay.

The certified public accountant thus obtains an information technology tool which can be useful to him in the mastering of his responsibilities, which stretches into the business future, in particular also in the improvement of the “quality of the collaboration of supervisory board and auditor”<sup>21</sup>. With proper utilization of the diversity of the possibilities of the dynamic rendering of accounts he would be able, continuously and topically, to convey to the supervisory board information on the development of the business, which is rather superior to that of management but, in any case, is in no way inferior<sup>22</sup>.

## 8. Dynamic rendering of accounts and balanced scorecard

The approaches of the Balanced Scorecard (BSC)<sup>23</sup> management method are derived from the basic thesis that the traditional accounting model is applicable only for past events<sup>24</sup>. This basic thesis does not correspond with the published status of research<sup>25</sup>.

With the employment of the dynamic rendering of accounts the BSC is given a completely different caliber. Linked annual financial statements over an arbitrary number of future years is created from unlinked input variables. The unlinked input variables are nothing other than the future performances of the business, converted into material planning values and assumed values, aimed at using the BSC. As opposed to the theory of the BSC, which “sees the financial perspective, the customer perspective, the internal perspective and the innovation perspective as balanced”<sup>26</sup>, the financial future perspective is placed, clearly hierarchically, above the other perspectives. In this, the other perspectives have to reflect completely in historical sequence.

It is true that the BSC, in order to forestall a disillusioning of the business due to a lack of visible success<sup>27</sup>, is always to be applied related to results and towards financial targets<sup>28</sup>. But how should it do this? Using the traditional model for the rendering of accounts which, according to the opinion of the developer of the BSC, orients itself immovably on historical values<sup>29</sup>, this is certainly not feasible. Only if the BSC

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<sup>20</sup> Zöllner, Aktienrechtliche Binnenkommunikation in Unternehmen [Internal communication within firms under stock corporation law] in Noack/Spindler, Unternehmensrecht und Internet - Neue Medien in Aktien-, Börsen-, Steuer- und Arbeitsrecht [Business law and the Internet - new media in stock corporation-, stock market-, tax- and labour law], 2001, p. 70.

<sup>21</sup> Zöllner, Fn. 20, p. 85.

<sup>22</sup> “Without the development of proper programs which make the future easier” (Zöllner, Fn. 20, p. 86) there is, however, scepticism. The simulation software ASRAP, which is based on the technology of input-output simulation, delivers the correct program.

<sup>23</sup> Kaplan/Norton, Balanced Scorecard, 1997.

<sup>24</sup> Kaplan/Norton, Fn. 23, p.7: The collision between the pressure of creating competitive advantages and the unshakable objective of an accounting model oriented to historic values has produced a synthesis: the Balanced Scorecard. It contains out and out traditional financial characteristic values. Nevertheless these financial characteristic values reflect solely past events.”

<sup>25</sup> To that end: Dauner/Dauner-Lieb, Fn. 1 and Chap. 2. Dynamic rendering of accounts and simulation.

<sup>26</sup> Kaplan/Norton, Fn. 23, p. 2: “The Scorecard measures the performance of the firm from four balanced perspectives: the financial perspective, the customer perspective, the internal perspective and the innovative perspective”.

<sup>27</sup> Kaplan/Norton, Fn. 23, p.145: The unavoidable result is a disillusionment of such firms through a lack of visible results of the amendment programs”

<sup>28</sup> Kaplan/Norton, Fn. 23, p. 145: “A BSC must always lay heavy emphasis on results, in particular on financial results such as ROCE and EVA” and “The chain of cause and effect of all characteristic values of the Scorecard should be linked with financial targets.”

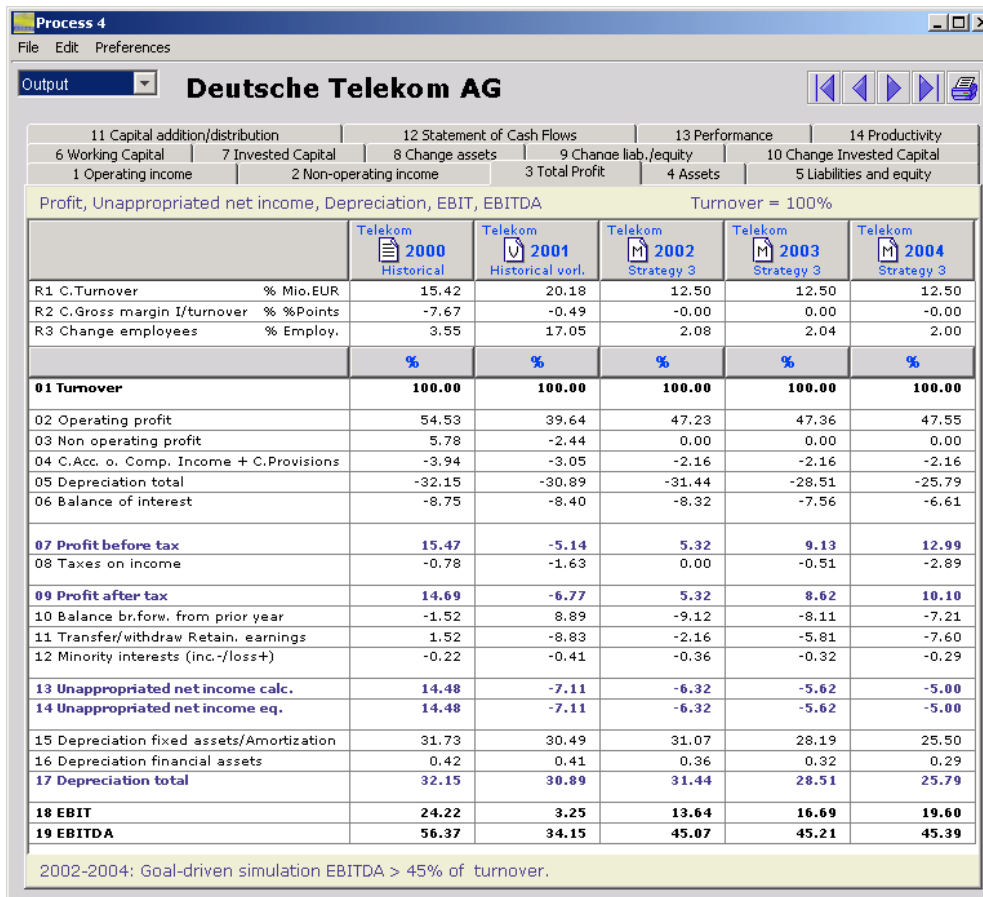
<sup>29</sup> See above Kaplan/Norton, Fn. 24.

activities are converted entirely into the input variables of dynamic rendering of accounts, and that at the right point and precisely in that planning year in which these activities are to lead to improved results, do the financial effects of the aimed for modifications become clearly verifiable. Financial results such as ROCE, EVA and many others are automatically thrown out as derivative from the dynamic rendering of accounts. It is only then that it indicates whether the expense which become necessary with the introduction of the BSC is justified.

Put in another way: without integration into a dynamic rendering of accounts the BSC approach, because it cannot be represented in its future financial effects, is a non-verifiable “soft” attempt. Only with the application of the input-output simulation does the BSC, translated into the hard figures of prospective annual statements of account and their financial results, obtain the bite which everyone in the business understands.

## 9. Example: Deutsche Telekom AG 2000-2004 (in 3 strategies)

Each ASRAP dynamic rendering of accounts, in addition to the normal representation in the annual financial statement and the statement of profit and loss, has two further fundamental forms of presentation: Input and Output. The Input contains the *unlinked* planning details entered by the user. The Output contains *linked* dynamic rendering of accounts simulated from these details by the software. These are presented, completely transparently, over 14 pages. Fig. 1 shows, for example, Output 3 (Strategy 3 in % of turnover) of the ASRAP dynamic rendering of accounts. EBIT and EBITDA are reported automatically.



	Telekom 2000 Historical	Telekom 2001 Historical vorl.	Telekom 2002 Strategy 3	Telekom 2003 Strategy 3	Telekom 2004 Strategy 3
R1 C.Turnover % Mio.EUR	15.42	20.18	12.50	12.50	12.50
R2 C.Gross margin I/turnover % %Points	-7.67	-0.49	-0.00	0.00	-0.00
R3 Change employees % Employ.	3.55	17.05	2.08	2.04	2.00
	%	%	%	%	%
<b>01 Turnover</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
02 Operating profit	54.53	39.64	47.23	47.36	47.55
03 Non operating profit	5.78	-2.44	0.00	0.00	0.00
04 C.Acc. o. Comp. Income + C.Provisions	-3.94	-3.05	-2.16	-2.16	-2.16
05 Depreciation total	-32.15	-30.89	-31.44	-28.51	-25.79
06 Balance of interest	-8.75	-8.40	-8.32	-7.56	-6.61
<b>07 Profit before tax</b>	<b>15.47</b>	<b>-5.14</b>	<b>5.32</b>	<b>9.13</b>	<b>12.99</b>
08 Taxes on income	-0.78	-1.63	0.00	-0.51	-2.89
<b>09 Profit after tax</b>	<b>14.69</b>	<b>-6.77</b>	<b>5.32</b>	<b>8.62</b>	<b>10.10</b>
10 Balance br.forw. from prior year	-1.52	8.89	-9.12	-8.11	-7.21
11 Transfer/withdraw Retain. earnings	1.52	-8.83	-2.16	-5.81	-7.60
12 Minority interests (inc./-/loss+)	-0.22	-0.41	-0.36	-0.32	-0.29
<b>13 Unappropriated net income calc.</b>	<b>14.48</b>	<b>-7.11</b>	<b>-6.32</b>	<b>-5.62</b>	<b>-5.00</b>
<b>14 Unappropriated net income eq.</b>	<b>14.48</b>	<b>-7.11</b>	<b>-6.32</b>	<b>-5.62</b>	<b>-5.00</b>
15 Depreciation fixed assets/Amortization	31.73	30.49	31.07	28.19	25.50
16 Depreciation financial assets	0.42	0.41	0.36	0.32	0.29
<b>17 Depreciation total</b>	<b>32.15</b>	<b>30.89</b>	<b>31.44</b>	<b>28.51</b>	<b>25.79</b>
<b>18 EBIT</b>	<b>24.22</b>	<b>3.25</b>	<b>13.64</b>	<b>16.69</b>	<b>19.60</b>
<b>19 EBITDA</b>	<b>56.37</b>	<b>34.15</b>	<b>45.07</b>	<b>45.21</b>	<b>45.39</b>

2002-2004: Goal-driven simulation EBITDA > 45% of turnover.

Fig. 1: Operating Profit (Cash), Annual Net Profit, Net Result, EBITDA

The problem “Black Box” does not exist. The simulated values are shown both absolutely and as % of turnover. Turnover, gross earnings margin, employees, personnel costs/employee-year, and productivity values are shown in their change to the previous year. Core of the Output is a flow of funds analysis coming from turnover. A system of characteristic values, which are calculated automatically for each simulated year, leads to a dynamic business analysis.

The diversity of the (quantitative) views into a reporting unit (corporate group, concern, business segment) to be gained from ASRAP dynamic rendering of accounts goes far beyond the conventional rendering of accounts.

As an example, Deutsche Telekom AG is simulated in three strategies for the years 2002-2004. In Strategies 1 and 2 an increase in turnover of 12.5 and 17.5 % respectively (price increases) is assumed. Strategy 3 describes a goal-driven simulation using EBITDA  $\geq$  45% of turnover.

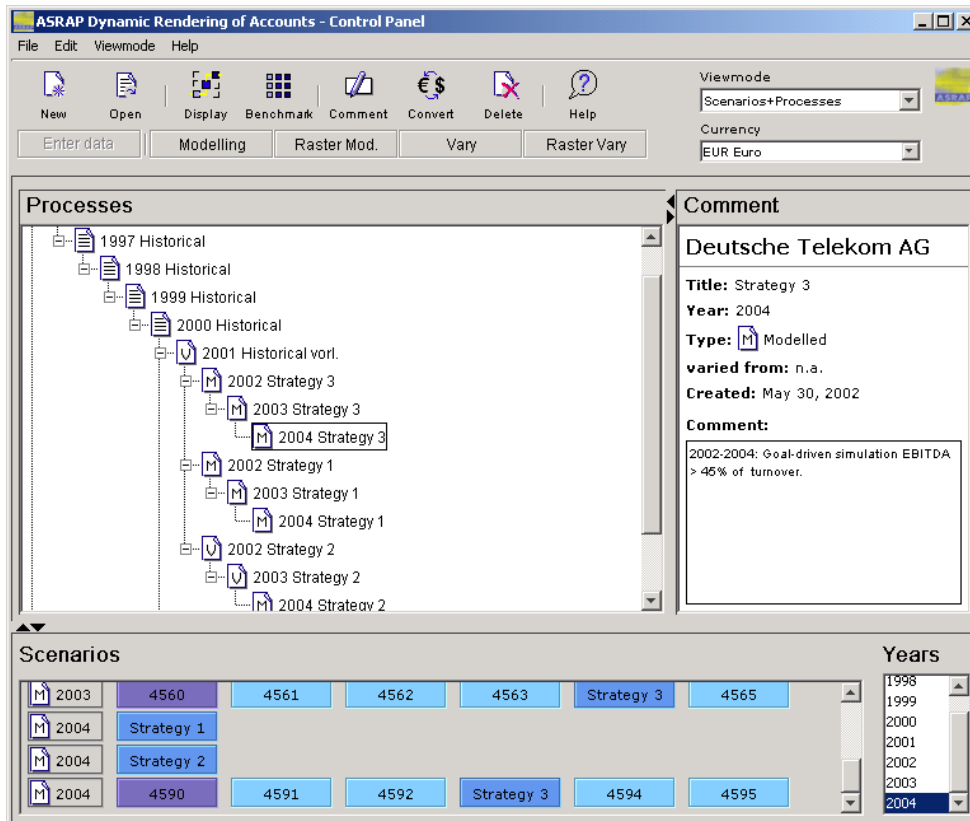


Fig. 2: ASRAP Dynamic rendering of accounts – Control Panel

The three strategies are measured against each other at the end in a comparison for 2004.

**Strategy 1: Status quo is updated using an annual 12.5% increase in turnover.**

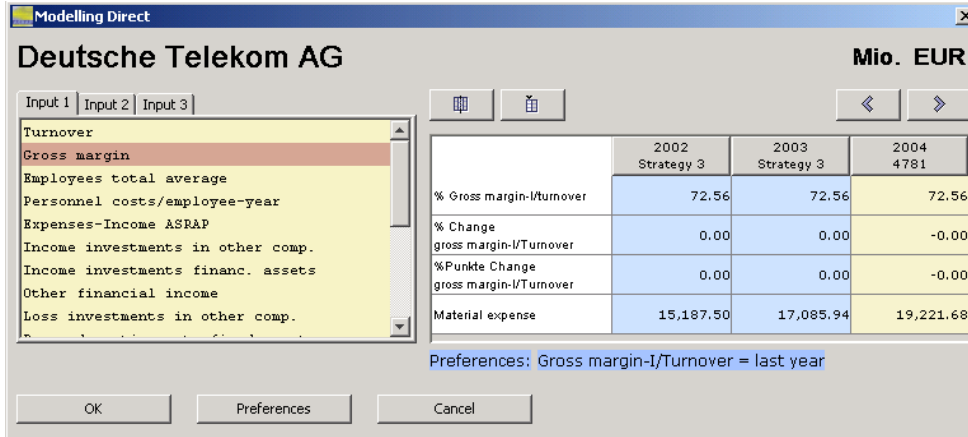


Fig. 3: Input dialogue: direct modeling (gross earnings margin constant)

Strategy 1: Updating of the status quo					
Input (in billion (10 <sup>9</sup> ) Euro)			2002	2003	2004
Growth of turnover			12.50%	12.50%	12.50%
Material expense			15.19	17.09	19.22
Increase in employees (individuals)			5000	5000	5000
Addition to fixed assets			20.00	20.00	20.00
Addition to financial assets			2.00	2.00	2.00
Capital distribution (dividends)			1.55	1.55	1.55
Depreciation/Amortisation			17.20	analytical value	

Output (in billion (10 <sup>9</sup> ) Euro)	2000	2001	2002	2003	2004
Operating profit	22.32	19.50	22.73	26.40	30.58
Balance of interest	-3.58	-4.13	-4.73	-4.98	-4.97
Profit before tax	6.33	-2.53	-0.40	2.49	6.19
Change of indebtedness flow of funds	16.89	13.15	5.96	2.57	-1.60
Liabilities to financial institutions	9.01	14.16	20.12	22.69	21.09
Cash flow from operating activity	19.39	15.26	17.79	21.18	25.35
Cash flow from investment activity	-37.78	-55.30	-22.00	-22.00	-22.00
Cash flow from financial activity	19.11	40.04	4.21	0.82	-3.35
<b>EBITDA Margin (% of turnover)</b>	<b>56.37%</b>	<b>34.15%</b>	<b>38.90%</b>	<b>40.24%</b>	<b>41.49%</b>
Return on invested capital	9.47%	1.55%	3.34%	5.26%	7.42%
Productivity/Employee-Year (T€)	150.4	125.8	138.7	152.9	168.6

Fig. 4: Selection of Input and Output values with Strategy 1

**Strategy 2: Status quo is updated using an annual increase in turnover of 17.5%.**

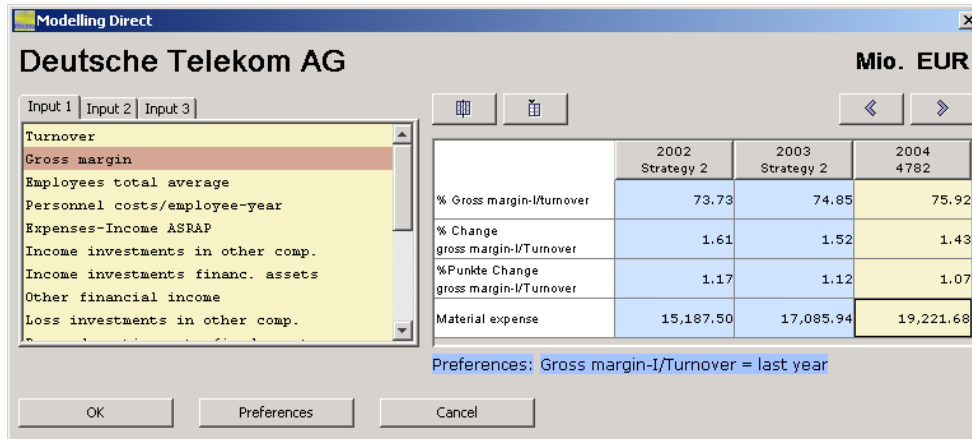


Fig. 5: Input dialogue: direct modeling (material expense as for Strategy 1)

Strategy 2: Increasing prices					
Input (in billion (10 <sup>9</sup> ) Euro)			2002	2003	2004
Growth of turnover			17.50%	17.50%	17.50%
Material expense			15.19	17.09	19.22
Increase in employees (individuals)			5000	5000	5000
Addition to fixed assets			20.00	20.00	20.00
Addition to financial assets			2.00	2.00	2.00
Capital distribution (dividends)			1.55	1.55	1.55
Depreciation/Amortisation			17.20	analytical value	

Output (in billion (10 <sup>9</sup> ) Euro)	2000	2001	2002	2003	2004
Operating profit	22.32	19.50	24.91	31.42	39.25
Balance of interest	-3.58	-4.13	-4.65	-4.67	-4.44
Profit before tax	6.33	-2.53	1.87	7.29	14.69
Change of indebtedness flow of funds	16.89	13.15	3.69	-1.54	-3.59
Liabilities to financial institutions	9.01	14.16	17.86	16.32	12.72
Cash flow from operating activity	19.39	15.26	20.06	25.29	27.34
Cash flow from investment activity	-37.78	-55.30	-22.00	-22.00	-22.00
Cash flow from financial activity	19.11	40.04	1.94	-3.29	-5.34
<b>EBITDA margin (% of turnover)</b>	<b>56.37%</b>	<b>34.15%</b>	<b>41.02%</b>	<b>43.49%</b>	<b>46.41%</b>
Return on invested capital	9.47%	1.55%	4.76%	8.10%	12.32%
Productivity/Employee-Year (T€)	150.4	125.8	147.6	173.0	202.6

Fig. 6: Selection of Input and Output values with Strategy 2

**Strategy 3: Goal-driven simulation for EBITDA  $\geq$  45% of turnover.  
 Status quo is, as with Strategy 1, updated using 12.5% of turnover.**

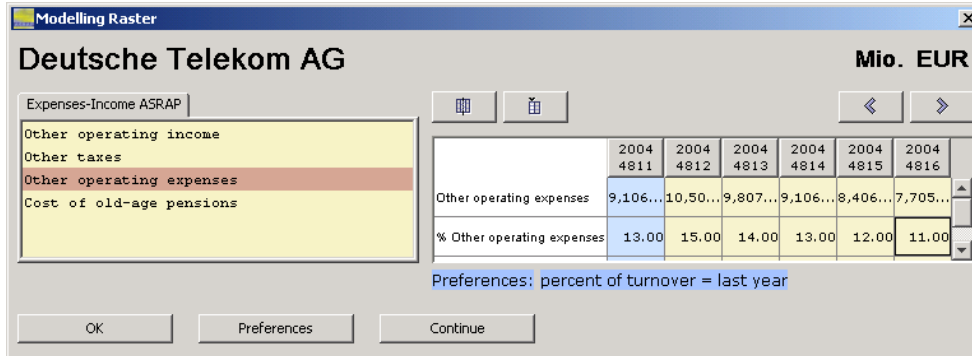


Fig. 7: Input dialogue: grid (raster) modeling (other operating expenses are reduced on a raster basis from 15% to 11% of turnover.)

From the basic scenario any desired number of scenarios, in this case five varying from each other in the other operating expenses, are created on a raster basis. Using the function Data Mining the system seeks the scenario which leads to the desired EBITDA or even to other target figures.

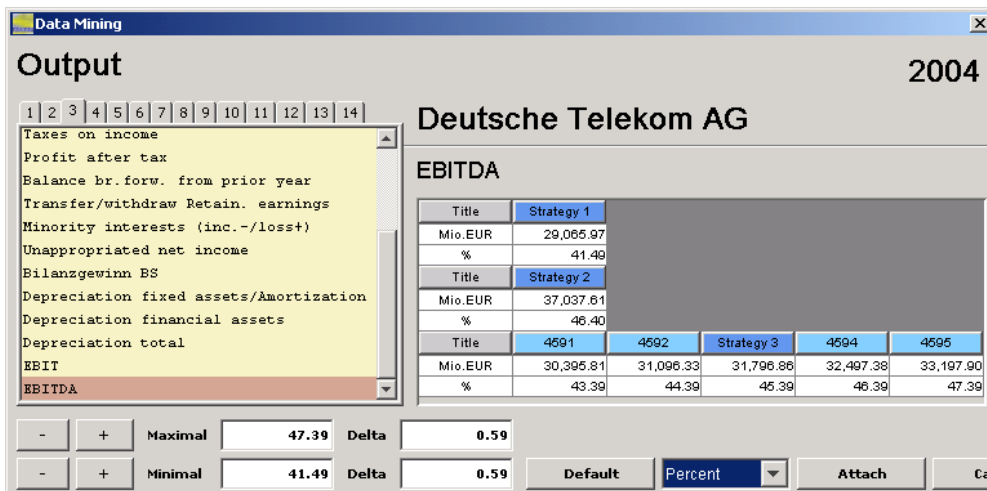


Fig. 8: Function: Data Mining (goal seeking EBITDA  $\geq$  45%)

The selection menu is built up as for the Output. It has 14 pages. All scenarios which have been created for one simulation year are displayed both absolutely as well as by percentage. On Output 3 the line EBITDA is selected. The target value 45 is entered in the field "Minimum". In order to shield the higher

(in this year) value which is not sought, 45.5 is entered in the field “Maximum”. Only one scenario is visible. With acceptance, the remaining scenario, which leads to EBITDA  $\geq$  45% of turnover, is added to the 2000-2003 process.

<b>Strategy 3: Goal-driven simulation EBITDA <math>\geq</math> 45%</b>					
<b>Input (in billion (10<sup>9</sup>) Euro)</b>			<b>2002</b>	<b>2003</b>	<b>2004</b>
Growth of turnover			12.50%	12.50%	12,50%
Material expense			15.19	17.09	19,22
Increase of employees (individuals)			5000	5000	5000
Addition to fixed assets			20.00	20.00	20,00
Addition to financial assets			2.00	2.00	2,00
Capital distribution (dividends)			11.55	1.55	1,55
Depreciation			17.20	analytic value	
<i>Other operating income</i>			6000	6000	6000
<i>Other operating expenses of turnover</i>	<b>Raster simulation</b>		15%.14%.13%.12%.11%		

<b>Output (in billion (10<sup>9</sup>) Euro)</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Operating profit	22.32	19.50	26.14	29.49	33,31
Balance of interest	-3.58	-4.13	-4.60	-4.71	-4,63
Profit before tax	6.33	-2.53	2.94	5.69	9,10
Change in indebtedness flow of funds	16.89	13.15	2.42	-0.48	-2,64
Liabilities to financial institutions	9.01	14.16	16.58	16.10	13,46
Cash flow from operating activity	19.39	15.26	21.33	24.23	26,39
Cash flow from investment activity	-37.78	-55.30	-22.00	-22.00	-22,00
Cash Flow from financial activity	19.11	40.04	0.67	-2.23	-4,39
<b>EBITDA margin (% of turnover)</b>	<b>56.37%</b>	<b>34.15%</b>	<b>45.07%</b>	<b>45.21%</b>	<b>45,39%</b>
Return on invested capital	9.47%	1.55%	5.44%	7.13%	9,04%
Productivity/Employee-Year (T€)	150.4	125.8	152.6	165.3	179,3

<i>Other operating expenses (% of turnover)</i>	<b>Goal achieved at:</b>	13%	13%	13%
-------------------------------------------------	--------------------------	-----	-----	-----

Target value 45%

Fig. 9: Selection of Input and Output values with Strategy 3

Annual increase of turnover, material expense and, with this, also the gross earnings margin, are identical with those of Strategy 1. The other specifications, such as addition to fixed and financial assets, dividend payout, depreciation etc., are also identical with those of Strategy 1. Deviating from Strategy 1, the other operating income for 2002-2004 are set at 6000 million Euro (cash). In order to achieve an EBITDA  $\geq$  45%, the other operating expenses (cash) are, in 2002  $\leq$  13%, in 2003  $\leq$  13%, in 2004  $\leq$  13% of turnover. The absolute values derive from Output 1, which is not shown here.

Using the function Benchmarking any desired processes can be compared. The form of presentation is the same as for Input and Output. As an example, Output 12 is shown with the flow of funds. The level of debt flow of funds at the end of the year is the same as the level of debt financial statement at the end of the year. The sequence of the positions of the flow of funds corresponds with practical considerations. They can be modified arbitrarily. No sign signifies an inflow of capital, a negative sign signifies an

outflow of capital. The balance of interest and total income taxes are identical in the flow of funds (Output 12) and in the statement of profit and loss (Output 3). The cash flows from operating activity, investment activity and financial activity correspond with the normal definition.

**Benchmarking 2**  
File Edit Preferences

Output **Comparison of strategies in 2004**

Deutsche Telekom AG

	Telekom M 2004 Strategy 1	Telekom M 2004 Strategy 2	Telekom M 2004 Strategy 3
	Mio. EUR	Mio. EUR	Mio. EUR
<b>01 Turnover</b>	<b>70,052.34</b>	<b>79,813.93</b>	<b>70,052.34</b>
<b>02 Indebtedness start year (balance)</b>	<b>77,712.20</b>	<b>71,336.34</b>	<b>71,117.35</b>
03 Operating profit	30,577.60	39,247.95	33,308.49
04 Non operating profit	0.00	0.00	0.00
05 Change Working Capital	-260.01	-380.19	-260.01
06 Minority interests (inc./loss+)	-200.00	-200.00	-200.00
07 Change minority interest	0.00	0.00	0.00
08 Capital addition	0.00	0.00	-0.00
09 Capital distribution (dividends)	-1,550.00	-1,550.00	-1,550.00
10 Addition to fixed assets	-20,000.00	-20,000.00	-20,000.00
11 Retirement of fixed assets	0.00	0.00	0.00
12 Addition to financial assets	-2,000.00	-2,000.00	-2,000.00
13 Retirement of financial assets	0.00	0.00	0.00
14 Balance of interest	-4,969.42	-4,443.77	-4,633.07
15 Taxes on income	0.00	-7,083.18	-2,024.92
<b>16 Indebtedness end of year (cash flow)</b>	<b>76,114.03</b>	<b>67,745.52</b>	<b>68,476.86</b>
<b>17 Indebtedness end of year (balance)</b>	<b>76,114.03</b>	<b>67,745.52</b>	<b>68,476.86</b>
<b>18 Change Indebtedness (cash flow)</b>	<b>-1,598.17</b>	<b>-3,590.81</b>	<b>-2,640.49</b>
19 Indebtedness-average-year	76,913.12	69,540.93	69,797.11
20 Cash by/for(-) operating activit.	25,348.17	27,340.81	26,390.49
21 Cash by/for(-) investing activit.	-22,000.00	-22,000.00	-22,000.00
22 Cash by/for(-) financing activit.	-3,348.17	-5,340.81	-4,390.49
<b>23 C.Cash and cash equiv. from Cash Flow</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
24 Gross Cash Flow	25,608.18	27,721.01	26,650.50
25 Free Cash Flow	6,354.53	8,467.35	7,236.55

Statement of Cash Flows, Change Cash and cash equivalents Turnover = 100%

Strategies: 1+3 12,5%, 2 17,5 % annual increase in turnover. 3 goal-driven simulated EBITDA > 4...

Fig. 10: Output 12, flow of funds (extract)

The complete benchmarking of the ASRAP dynamic rendering of accounts shows, on 14 pages, all desired insights into the results of simulations. In particular, the benchmarking of the input which, due to reasons of space, is not shown here, is also interesting. For the management control of a business concern (reporting unit), it is particularly helpful as it completely documents the planning assumptions entered by the user. Using the function *Vary* these assumptions can, as required, be modified progressively.

In Fig. 11, as an example, the essential simulation results of Strategies 1, 2 and 3 are compared. Strategy 2, with increasing prices, comes out best.

<b>Comparison of Strategies in 2004</b>			
<b>Output (in billion (10<sup>9</sup>) Euro)</b>	<b>Strategy 1</b>	<b>Strategy 2</b>	<b>Strategy 3</b>
Operating profit	30.58	39.25	33.31
Balance of interest	-4.97	-4.44	-4.63
Profit before tax	6.19	14.69	9.10
Change in indebtedness	-1.60	-3.59	-2.64
Liabilities to financial institutions	21.09	12.72	13.46
Cash flow from operating activity	25.35	27.34	26.39
Cash flow from investment activity	-22.00	-22.00	-22.00
Cash flow from financial activity	-3.35	-5.34	-4.39
<b>EBITDA margin (% of turnover)</b>	<b>41.49%</b>	<b>46.41%</b>	<b>45.39%</b>
Return on invested capital	7.42%	12.32%	9.04%
Productivity/Employee-Year (T€)	168.6	202.6	179.3

Fig. 11: Comparison of strategies in 2004

Conclusions: Strategy 1 assumes a normal development of the business concern. Strategy 2 is difficult and not very realistic. Customers will resist. Strategy 3 builds on savings with other operating expenses. All planned (assumed) value drivers are recorded completely in the three strategies in the correct planning year and at the correct position.<sup>30</sup> In the dynamic rendering of accounts there are no “gaps in values or in the annual financial statement”.<sup>31</sup>

## 10. Final remark

It should be a fundamental concern of knowledge management and business intelligence to eliminate entirely the gaps in understanding between conventional

accounting and strategic controlling<sup>32</sup>. The dynamic set of accounting figures of input-output simulation does precisely this. The global figures of the annual statement of accounts over the business past, present and simulated future are represented without a gap in a self-contained rendering of accounts. The future-oriented, flexible and, at the same time, realistic thinking of the leading members of staff which can orient itself smoothly to the figures shown from the past and present, is the knowledge which is to be made useful. In the form of dynamic rendering of accounts it is standardized and, as a result of the standardization, it is made directly comparable and capable of being discussed. A dynamic analysis of the business, realistic from the respective daily aspect, provides the business with an enormous start for adaption measures. The so-called “gap in values or annual financial statement”<sup>33</sup>, deplored by balance

<sup>30</sup> Comp. Dauner/Lörcher (2001) and Dauner/Dauner/Lörcher (2002).

<sup>31</sup> Comp. Küting (2001a), p.14: “With an eye on balancing accounts as an essential instrument of capital market communication, gaps in value or in the statement of accounts throw up questions of a fundamental type. For the greater this is then the more value drivers are no longer recorded in the classical annual statement of accounts and thus are missed in the traditional rendering of accounts”.

<sup>32</sup> Hauschild/Leker, Bilanzanalyse unter dem Einfluss moderner Analyse- und Prognoseverfahren [Financial statement analysis under the influence of modern analysis and prediction methods], BfuP 3/95, p. 256: “The representatives of classic accounting, in their thinking, are past-oriented and not future-related. Conversely, typical planners are not used to keeping to the strict standards of self-reconciled accounting”.

<sup>33</sup> Küting, Bilanzierung hinkt der Marktbewertung hinterher [Preparation of balance sheets lags behind market assessment], Handelsblatt

sheet experts, is ruled out. Using the dynamic set of accounting figures of input-output simulation all value drivers, and this without a gap, are recorded at the right place and, what is fundamentally important, in the correct planning year. The resultant rendering of accounts about the business future can be updated continuously. As it and its computer-supported realization is mathematically founded, it can be applied generally and internationally, independent of the standards for the rendering of accounts (HGB, IAS, US-GAAP). The dynamic rendering of accounts using the information technology approach of input-output simulation thus opens up a completely new, highly effective future-oriented route for business intelligence.

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