WORKING PAPER

Strategic alignment of manufacturing processes in a Balanced Scorecard-based compensation plan: a theory illustration case

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Oktober 2003

2003/16X

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D/2003/7012/3X
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Abstract
The present paper integrates the operations management and the management control literature in order to focus on the issue of strategic alignment of manufacturing processes in a Balanced Scorecard-based compensation plan. The specific objectives for this paper are twofold. First, the study offers a theoretical foundation for the thesis that alignment of manufacturing processes with business strategy will result in higher organizational performance. Second, a case study at a Belgian manufacturing division of a Danish Corporate Company shows that it is not possible to realize higher organizational performance when there is no strategic alignment of manufacturing processes.
**Introduction**

In the first of three Harvard Business Review articles, Kaplan and Norton (1992) introduced the Balanced Scorecard (BSC). Kaplan and Norton (1996) defined the BSC as a framework to facilitate the translation of strategy into action. More specifically, the BSC has been labeled “a comprehensive system of linked measurements”. The characteristic of ‘comprehensiveness’ in the BSC involves the provision of measures into four different perspectives: the financial perspective, the customer perspective, the internal business process perspective and the learning and growth perspective. The characteristic of ‘linked measurements’ concerns the linkages between strategy and operational performance measures.

Initially, Kaplan and Norton (1996) treated the BSC as a *performance measurement system.* They began with the premise that an exclusive reliance on financial measures in a management system was causing organizations to do the wrong things. Financial measures are lagging indicators: they report on the outcomes of past actions. Exclusive reliance on financial indicators promoted short-term behavior that sacrificed long-term value creation. Therefore, the BSC retained the financial performance measures but supplemented them with nonfinancial performance measures or leading indicators. More recently, Kaplan and Norton (2001, a) have transformed the BSC from a performance measurement system to a *strategic management control system* (strategic performance measurement system). Kaplan and Norton became aware that successful organizations were strategy-focused organizations that used their BSCs to align key management processes and systems to the strategy (Kaplan and Norton, 2001, b, c). The final linkage from high-level strategy to day-to-day actions occurs when companies link individuals’ incentives and reward programs to the Balanced Scorecard. For the purposes of this paper we will define reward programs linked to the Balanced Scorecard a BSC-based compensation plan.

This paper aims to focus on the issue of strategic alignment of manufacturing processes in a BSC-based compensation plan, therefore this paper integrates operations management and management control literature.

In *operations management research*, there is a variety of authors that claim that a company will perform better if it links its operations strategy to the business strategy (Smith and Reece, 1999). In this study, strategic alignment of manufacturing processes
is defined in terms of clear links between the manufacturing processes (at the functional level) and the business strategy (at the corporate level). Having clear links between the manufacturing processes and the business strategy encompasses decomposing high-level strategic measures into local operational measures (Kaplan and Norton, 1996). A high level financial measure such as return-on-investment or economic value added can be translated into local operational measures such as operating expenses, days sales in accounts receivable or gross margins. In the Balanced Scorecard (BSC) literature, the process of translating high level strategic measures into local level operational measures is called ‘the cascading process’.

In the operations management literature, there is a research stream that examines the relationship between strategic alignment and organizational performance. Joshi et al. (2003) studied the relationship between alignment of manufacturing priorities (between the manufacturing manager and the general manager) and the manufacturing unit’s performance. Smith and Reece (1999) studied this relationship in a service setting (wholesale distribution setting). In general, these studies found a positive effect of strategic alignment on organizational performance; however contingency variables might moderate the original relationship.

In a BSC-setting, there is also an issue of strategic alignment of manufacturing processes through cascading. However, Ittner and Larcker (1998) stated that there has been conducted surprisingly little research on the performance consequences of the Balanced Scorecard Concept. In other words, in a BSC-setting, there is no empirical evidence that strategic alignment between the business strategy and the operations strategy will lead to higher organizational performance.

The creation of strategic alignment between the business strategy and the operations strategy involves a strategic management control system that includes operational performance measures deducted from the business strategy. In management control, there is a research stream that examines the performance consequences of matching the business strategy to the strategic management control system. The case studies of Abernethy and Lillis (1995) showed that a combination of more non-accounting performance measures in the management control system and a strategy of manufacturing flexibility improved organizational performance. The questionnaire survey of Perera et al. (1997) found an association between customer-focused strategies
and the use of nonfinancial (operations-based) performance measures. However, their study was not able to find a consequential effect on organizational performance. Perera et al. (1997) attributed this lack of improved organizational performance to the absence of a performance-based compensation plan.

In this paper, we want to investigate if the relationship between strategy, choice of performance measures and organizational performance in conjunction with a performance-based compensation plan can lead to higher organizational performance because in practice many companies make a link between the compensation plan and the performance measurement system. More specifically, we want to investigate this research question in a BSC-setting because Ittner and Larcker (1998) stated that the performance consequences of this link are not yet investigated.

In light of these opportunities, the specific objectives for this paper are twofold:

1) We develop the proposition that the alignment of manufacturing processes with the corporate strategy is a precondition to motivate higher organizational performance with a BSC-based compensation plan (theoretical foundation).

2) We want to show, by means of a case study, that it is not possible to realize higher organizational performance when there is no strategic alignment of manufacturing processes (theory illustration case).

**Theoretical foundation**

Joshi et al. (2003) tested whether the performance of the manufacturing unit is enhanced when general managers and manufacturing managers agree on strategic priorities. Their study found indirect effects of strategic alignment on organizational performance because the relationship between strategic alignment and organizational performance was moderated by organizational variables.

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3 The relationship between strategic alignment and organizational performance was moderated by organizational variables such as organizational tenure of the manufacturing manager and years of association between the general manager and the manufacturing manager. More specifically, they found that strategic alignment of manufacturing processes is especially critical when the manufacturing managers are relatively new to the organization (Joshi et al. 2003).
The study of Smith and Reece (1999) demonstrated that the fit between the business strategy and the operational strategy has a significant positive and direct effect on organizational performance. More importantly, they found that this fit was a more important determinant of organizational performance than the type of strategy. In other words, it was not the type of strategy (low cost strategy, differentiation strategy or a combination strategy) that determined organizational performance but it was the extent of fit between the business strategy and the operational strategy that determined organizational performance.

Thus, we get the following premiss:

P1: As strategic alignment between the business goals (corporate level) and the operational goals (functional level) increases, organizational performance will increase.

In BSC-organizations, the cascading process is used to align employees to the strategic objectives of the firm. Furthermore, the cascading process has a role in customizing the BSC to the (sub)-units because during the cascading process high-level strategic objectives are translated into local actions (Epstein and Manzoni, 1998). Through the cascading process a BSC-organization is able to define controllable performance measures. A performance measure is under control if the manager can control the probability distribution of the performance measure through his actions (Antle and Demski, 1988).

Thus, we get the following premiss:

P2: As strategic alignment of manufacturing processes increases, the controllability of performance measures will increase.

Strategic alignment of manufacturing processes results in controllable performance measures. Through strategic alignment, individuals are intrinsically motivated to accomplish organizational goals (Kaplan and Norton, 1996). The strategic alignment process enables individuals to see the link between what they do and the organization’s long-term objectives. Through strategic alignment of manufacturing processes individuals internalize the organizational goals and strive to achieve those goals even when these goals are not explicitly tied to the compensation plan.
Several studies have found that this kind of intrinsic motivation leads to more creative problem solving and to innovation and consequently to higher organizational performance (Baker, 1988; Sansone and Harackiewicz, 2000). Thus, we arrive at the following premiss:

P3: Increased controllability of performance measures will result in higher organizational performance through intrinsic motivation.

We use Vroom’s (1964) expectancy theory to explain how extrinsic motivation can lead to higher organizational performance. Vroom’s theory has been summarized as follows: “The strength of a tendency to act in a certain way depends on the strength of an expectancy that the act will be followed by a given consequence (or outcome) and on the value or attractiveness of that consequence (or outcome) to the actor” (Kreitner et al. 2002). There are three key concepts in Vroom’s model namely: expectancy, instrumentality and valence. An expectancy represents an individual’s belief that a particular degree of effort will be followed by a particular level of performance. An instrumentality represents a person’s belief that a particular outcome (e.g. bonus) is contingent on accomplishing a specific level of performance. A valence refers to the positive or negative value people place on outcomes.

Therefore, according to expectancy theory, an individual’s motivation and subsequent effort are significantly higher when compensation is based on performance, due to both an increased expectancy about the effort-outcome relationship and an increased valence of the outcome (Bonner and Sprinkle, 2002).

So, we arrive at the following premiss.

P4: Financial incentives linked to controllable performance measures will result in higher organizational performance through extrinsic motivation.

Above premisses are depicted in figure 1.
Figure 1: Theoretical model of strategic alignment of manufacturing processes and organizational performance
Methodology

Choice of research method

According to Shields (1997), following research methods are frequently found in management control: analytic research, archival research, case study research, survey research and laboratory experimentation. When addressing the question: “Which research method is appropriate in our research project?”; Yin (1989) suggests that various research methods are not mutually exclusive. However, according to Yin (1989) there exist certain situations in which a specific research method has a distinct advantage. For the case study approach to have a distinct advantage, a ‘how’ or ‘why’ question should be asked about a contemporary set of events over which the researcher has little or no control (Yin, 1989, p. 20). The particulars of this study, in terms of the conditions suggested by Yin, strongly suggest the case study as the most appropriate research method.

We use Keating’s (1995) ‘framework for classifying and evaluating case research in management control’ as a guide to decide what information we must include in our case research paper. Because the objective of this case research paper is to provide evidence in support of above formulated theory, we want to conduct a theory illustration case study. More specifically, we want to apply above formulated theory to develop a unique explanation of our particular case.

Sampling

DC-Company, the company name has been disguised at the request of the participating company, is a leading producer of polyolefin plastics. The unit of analysis is a Belgian manufacturing division of a Danish Corporate Company. The research site consists of three manufacturing locations with a total production of 900,000 tons polyolefins in 1999. Sales amounted to 1,1 billion euro. DC-Company counted approximately 670 employees.

The authors gained access to this company because of a business relationship between one of the authors and executives of the company. In this sense, the case study has not benefited from a random sampling approach however the research site is attractive on objective grounds.

The data in this study were collected by way of in-depth interviews. Interviewees were chosen at random. Interview data were obtained from six middle-level managers who
were rewarded under the company’s BSC-based compensation plan. Among the middle-level managers, there were four production unit managers and two staff members. These managers had at the time of the interview at least one year of experience with the BSC-based compensation plan. They all experienced the complete introduction of the BSC-based compensation plan.

Data collection
The researchers obtained archival data (background and policy documents) from managers who administer the BSC and the BSC-based compensation plan. All interview data were obtained via in-depth interviews in August 2000. Interviews lasted from 30 minutes to 90 minutes, depending on how much an interviewee had to say. The two authors attended all interviews. One researcher asked questions and the other researcher took notes and captured commentary. After each interview, the two researchers conferred immediately to complete abbreviated comments that might be difficult to decipher later.

The study used a semi-structured interview format and assured respondents of anonymity. More specifically the researchers asked following open questions:
1. Describe the scorecard that serves as the basis for your BSC-based bonus.
2. What is the company’s strategy?
3. Do you feel more motivated to accomplish organizational goals after the implementation of the BSC-based compensation plan? (All interviewees experienced the complete introduction of the BSC-based compensation plan)

   Follow-up:
   In case of a positive experience with the BSC-based compensation plan:
   3.a. Which aspects of the BSC and the BSC-based compensation plan are major sources of your motivation?

   In case of a negative experience with the BSC-based compensation plan:
   3.b. Which aspects of the BSC and the BSC-based compensation plan are major sources of your demotivation and frustration?

An important benefit of open questions is that respondents may identify factors that affect the effectiveness of the BSC and of the BSC-based compensation plan other than those anticipated by the study’s theory.
**Theory illustration case**

*Strategy of the research site*

The company’s strategy is to be a leader in issues affecting health, safety and environment (HSE). Top Management believes in a Zero Mindset, which means the determination to achieve zero work-related accidents, injuries and illness, and the steady reduction of plant emissions. DC-Company has high ambitions in setting challenging targets. They see only one way of winning – and that is with and through their people.

*Purpose of the BSC*

The most important aim of introducing the BSC in the Belgian manufacturing division was to improve goal orientation. Before the BSC, the company listed more than 100 initiatives for goal orientation. The first attempt to improve goal orientation was in January 1998. A few members of the management team agreed to cluster the initiatives and to group them into larger objectives. The first approach to become more goal-oriented was inspired by the EFQM-model. Since the EFQM-model is not a performance measurement system, the Corporate Company launched the BSC in the third quarter of 1998.

Furthermore, the BSC was used as an instrument for evaluating and compensating middle-level managers. The BSC was, in other words, the starting point for a BSC-based compensation plan.

*Structure of the BSC*

DC-Company has arranged its measures in categories that reflect its own priorities and culture. The four scorecard perspectives in this company are ‘Responsible Care’, ‘Manufacturing’, ‘Customer’ and ‘People’. The ‘Responsible Care’ perspective contains performance measures for health, safety and environment. The ‘Manufacturing’ perspective contains performance measures that represent the degree of efficiency of internal business processes. The performance measures in the ‘Customer’ perspective measure customer satisfaction. The performance measures in the ‘People’ perspective are measures for the learning and growth-capacity.

A summary of the measures currently used in the BSC of DC-Company is shown in table 1.
<table>
<thead>
<tr>
<th>Perspective</th>
<th>Performance measure</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible care</td>
<td>Industrial accidents</td>
<td>No industrial accidents</td>
</tr>
<tr>
<td>Responsible care</td>
<td>Sick leave due to industrial accidents</td>
<td>Healthy employees</td>
</tr>
<tr>
<td>Responsible care</td>
<td>Factory emissions</td>
<td>No factory emissions</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Fixed costs</td>
<td>Minimize fixed costs</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Labor costs</td>
<td>Minimize labor costs</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Scrap</td>
<td>Minimize scrap</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Productivity</td>
<td>Maximize productivity</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Rework</td>
<td>Minimize rework</td>
</tr>
<tr>
<td>People</td>
<td>Sick leave</td>
<td>High motivated employees</td>
</tr>
<tr>
<td>People</td>
<td>Training days</td>
<td>Multi-skilled employees</td>
</tr>
<tr>
<td>Customer</td>
<td>On time delivery</td>
<td>Satisfied customers</td>
</tr>
<tr>
<td>Customer</td>
<td>Complaint frequency</td>
<td>Satisfied customers</td>
</tr>
</tbody>
</table>

*Description of the BSC-based compensation plan*

The driving concept of BSC-based compensation plans is to pay individuals for performance. Pay for performance means that at least some portion of a manager’s income is not guaranteed but depends on results on performance measures. We will use the framework of Hilton (2003) to describe the BSC-based compensation plan of DC-Company.

*Absolute and relative performance*

DC-Company uses a mix of absolute and relative performance measures. DC-Company evaluates managers on absolute achievement of financial and nonfinancial measures for which it finds it possible to set appropriate absolute objectives. DC-Company also evaluates managers on relative achievement of financial and nonfinancial measures for which benchmarking data in comparative industries are available.
Financial and nonfinancial performance

Financial performance reflects the achievement of financial goals. Nonfinancial performance is not measured in monetary terms and often reflects the drivers of financial performance.

In table 2, you can find an overview of both financial and nonfinancial BSC performance measures used in the BSC-based compensation plan of DC-Company.

**Table 2: Performance measures in the BSC-based compensation plan**

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Performance measure</th>
<th>Financial/ Nonfinancial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible care</td>
<td># industrial accidents</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>Responsible care</td>
<td>Sick leave (days) due to industrial accidents</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Fixed costs (million €)</td>
<td>Financial</td>
</tr>
<tr>
<td>Manufacturing</td>
<td># ton rework</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>Manufacturing</td>
<td># ton scrap</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>Customer</td>
<td>Complaint frequency</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>Customer</td>
<td>On time delivery</td>
<td>Nonfinancial</td>
</tr>
<tr>
<td>People</td>
<td># training days</td>
<td>Nonfinancial</td>
</tr>
</tbody>
</table>

When you compare table 2 to table 1, you can see that DC-Company only links pay to those performance measures for which they think extrinsic motivation is needed to motivate performance on the measure.

Broad responsibility of performance

An organization can define performance narrowly or broadly. In this regard, a manager’s reward can depend on the performance of that individual, on the performance of the business unit or on the performance of the company as a whole. At DC-company rewards depend on the performance of the company and therefore managers have a broad responsibility for performance.

From expectancy theory, we know that financial incentives are most effective when performance measures are controllable, attainable and accurate (Vroom, 1964). In order
to have controllable performance measures in a BSC-environment, we consider strategic alignment of the manufacturing processes as a precondition. However, DC-Company has failed to cascade the BSC throughout the organization. DC-Company used a top-down approach to implement the BSC at the manufacturing division. The functional scorecard was developed centrally (on corporate level) and assigned to functional level without initial input from the divisions. As a consequence bonus pay of middle-level managers is determined by corporate performance on the performance measures and thus middle-level managers are confronted with uncontrollable, unattainable and inaccurate performance measures. We will discuss the consequences of this working method in the discussion section.

*Formula-based performance*

DC-Company bases rewards on a performance evaluation formula, which describes rewards earned for specific achievement. The advantage of a formula-based plan is that managers know precisely what is expected of them and what reward they will receive relative to expectations.

You can find a profound description of the BSC-based compensation plan in appendix 1. The most important feature of the BSC-based compensation plan is that financial incentives are linked to corporate performance measures.

*Current rewards*

Rewards for performance can be given now based on current performance or later based on sustained performance. DC-Company uses a current reward for middle-level managers.

*Cash bonus*

DC-Company rewards its managers a cash bonus at year-end.

**Results**

The interview data revealed that the link of the bonus pay to the BSC only had a minor impact on the motivation of the middle-level managers to contribute to organizational performance. Because of lack of cascading, bonus pay of middle-level managers and
staff personnel was contingent on corporate performance. In other words, bonus pay was contingent on the corporate BSC and not on the BSC of their manufacturing division. So, middle-level managers and staff personnel were evaluated based on the scorecard of the higher organizational level. The consequence of this design characteristic was that middle-level managers and staff personnel experienced the performance measures as uncontrollable. Especially staff personnel of the manufacturing division was confronted with objectives and measures on their scorecard that they could not influence because the high-level strategic objectives and measures were not translated into local measures. Middle-level managers and staff personnel were not enabled to use their local and specific knowledge to make operational key elements of their business unit’s strategy. They didn’t see how their particular actions contributed to achieving business unit objectives. Using Vroom’s expectancy theory, the expectancy that effort will lead to higher performance was violated. Therefore, middle-level managers and staff personnel were not extrinsically motivated to achieve organizational goals.

Apart from the lack of cascading, the interviews revealed two other reasons, not anticipated in our theoretical foundation, for the lack of controllability. Middle-level managers experienced performance measures as uncontrollable because performance measures could not be influenced in the medium or in the long term. Assume ‘days of sickness leave’ is a good measure of employee satisfaction but it may take two or more years to improve it. Another example is that middle-level managers experienced a lack of controllability when the portion of noise inherent to the performance measure was too high, specifically when the average event count per period was low. For example in a small unit, where the average number of sickness days is low; one accidental sickness period of only one worker may cause the performance measure to drop below target, although overall management care and employee satisfaction were under control.

Furthermore, the lack of cascading also violated the instrumental relationship between performance and outcome. It happened that middle-level managers didn’t earn a bonus although the projects for which they were responsible had been successful. It was possible that the target on the corporate performance measure was not achieved because one unit performed significantly below target. Since bonus pay was contingent on corporate performance, it was possible that every manager in the organization got penalized because of underperformance of one unit.
The last reason for the minor impact of the BSC-based compensation plan on performance had to do with the valence middle-level managers assigned to bonus pay. Expectancy theory states that monetary rewards have to be large enough to generate performance. At DC-Company, middle-level managers felt that the percentage of bonus pay was set too low. Maximum bonus pay was only 7% of yearly salary. Steven Kerr, chief learning officer at General Electric, estimated that monetary rewards must be at least 12% to 15% above employees’ base pay to truly motivate people (Kreitner & Kinicki, 2001, p. 251).

Due to the lack of strategic alignment of manufacturing processes, performance measures were not intrinsically motivating employees to contribute to organizational goals. Because of this lack, employees couldn’t see how their actions affected organizational goals.

To conclude, the objective of this paper was to demonstrate that strategic alignment of manufacturing processes is a precondition in a BSC-based compensation plan. We wanted to show that the BSC offers a unique device to align employees’ objectives and strategic objectives. The idea behind strategic alignment is to confront each level in the organization with controllable performance measures. Performance on those measures contributes to overall organizational performance. Middle-level managers who are confronted with high controllable performance measures will be intrinsically motivated to achieve higher organizational performance because they can see the link between what they do and the organization’s long term objectives. According to expectancy theory, linking extrinsic rewards to controllable performance measures will reinforce organizational performance. From the theory illustration case, we remember that the lack of cascading violates the effort\(\propto\)performance expectancy and the performance\(\propto\)outcome instrumentality. We also remember that bonus pay has to be large enough to improve organizational performance.

**Direction for future research**

According to Keating (1995), the recommended next step in a theory illustration case is to specify or to test the illustrated theory. We would like to formally test the relationship between strategic alignment of manufacturing processes and organizational performance.
in a BSC-environment. We think that a survey research will be an appropriate research methodology in order to test this research question.

As in Joshi (2003) and in Kathuria (2003), a survey method is appropriate to operationalize the strategic alignment construct. In order to operationalize the strategic alignment construct we will need to collect matched pairs of data from two levels (corporate level and functional level) for each participating company.

It is our contention that the relationship between strategic alignment of manufacturing processes and organizational performance will be moderated by contingency variables such as the nature of the business environment, the nature of the technology, the size of the manufacturing unit, the structure of the manufacturing unit, the business strategy, ... (Chenhall, 2003). Therefore we think that contingency research in this area is a promising direction for future research.
References


**Appendix 1**

This appendix illustrates DC-Company’s BSC-based compensation plan. The BSC-based compensation plan is built on eight performance measures. Each performance measure is weighted. All performance measures are aggregated in a performance index parameter. The following formula is used to determine bonus pay as a percentage of yearly salary:

| **Bonus pay as percentage of yearly salary** | \[ = 7 \% \text{ of yearly salary (in year 2000)} \times \text{performance index parameter (\%)} \] |
| **Performance index parameter** | \[ = \sum \text{total score on each performance measure} \] |
| **Total score on each performance measure** | \[ = \text{Result factor} \times \text{weight of the performance measure} \] |
| **Result factor** | The result factor indicates the extent to which the target on the performance measure is realized. |

As we see, the formula to calculate the bonus pay consists of two factors: (1) the maximum percentage of yearly salary that is variable (7% in year 2000) and (2) the performance index parameter. High performance on the performance index parameter can only be achieved by scoring high on the eight different performance measures. Due to lack of strategic alignment of manufacturing processes, the score on these performance measures can only be influenced by corporate performance and not by individual performance of middle-level managers. The performance index parameter (%) is the sum of contributions of each performance measure. The contribution of each performance measure is the product of ‘weight of each performance measure’ and a ‘result factor’. The result factor is calculated by a program in function of the ‘actual result’ versus the ‘borders’. DC-Company has defined four borders. Border 1 corresponds with a degree of target realization of 70%, border 2 corresponds with a degree of target realization of 90%, border 3 corresponds with a degree of target realization of 110% and border 4 corresponds with a degree of target realization of 130%.
Figure 2 shows the relation between the degree of target realization (border) and the result factor.

Figure 2: Relation between degree of target realization and result factor

Table 3 is an illustration of the calculation of the performance index parameter.
Table 3: Bonus pay calculation system

<table>
<thead>
<tr>
<th>KPI-parameters</th>
<th>Weight</th>
<th>border1</th>
<th>border2</th>
<th>border3</th>
<th>border4 actual result</th>
<th>Result factor %</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td># industrial accidents</td>
<td>12%</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3.5</td>
<td>50</td>
</tr>
<tr>
<td>Sick leave (days)</td>
<td>13%</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5.5</td>
<td>50</td>
</tr>
<tr>
<td>fixed costs (Million €)</td>
<td>13%</td>
<td>77.5</td>
<td>75</td>
<td>72.5</td>
<td>70</td>
<td>82.5</td>
<td>0</td>
</tr>
<tr>
<td># ton rework</td>
<td>12%</td>
<td>90,000</td>
<td>80,000</td>
<td>70,000</td>
<td>60,000</td>
<td>80,369</td>
<td>50</td>
</tr>
<tr>
<td># ton scrap</td>
<td>13%</td>
<td>120,000</td>
<td>100,000</td>
<td>80,000</td>
<td>60,000</td>
<td>121,246</td>
<td>0</td>
</tr>
<tr>
<td>complaint frequency</td>
<td>12%</td>
<td>0.40</td>
<td>0.30</td>
<td>0.20</td>
<td>0.10</td>
<td>0.43</td>
<td>0</td>
</tr>
<tr>
<td>on-time delivery</td>
<td>12%</td>
<td>97%</td>
<td>98%</td>
<td>99%</td>
<td>99.9%</td>
<td>96%</td>
<td>0</td>
</tr>
<tr>
<td># employees who follow course on multi-skilling</td>
<td>13%</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>53</td>
<td>50</td>
</tr>
</tbody>
</table>

Performance Index Parameter (%) = Sum of total score on each performance measure

25

Bonus pay as percentage (determined in advance)

7

Bonus pay as percentage of yearly salary = 25 % * 7 %

1.75 of salary
Assume that the actual result on industrial accidents is 3,5. This score is situated between border one and two (see table 3). This position corresponds with a degree of target realization between 70% and 90%. We can read the result factor from the chart: the result factor amounts to 50%. The contribution of the performance measure ‘industrial accidents’ to the performance index parameter is 6% (= 50% * 12%) given that the weight for the performance measure ‘industrial accidents’ is 12%. If we repeat this procedure for each performance measure, we are able to calculate the performance index parameter. By multiplying the performance index parameter with the maximum percentage of yearly salary that is variable, DC-Company is able to determine the bonus.