

# An Application of the Balanced Scorecard as a Strategic IT-Controlling Instrument for E-Business Development

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## Abstract

This paper presents a Balanced Scorecard (BSC) based approach for strategic IT-Controlling in the context of e-Business development. As today's first generation's e-Businesses implementations show, there is need for more IT- and Business Infrastructure Management to fit rapid changes in business strategy with the development of e-business. The theoretical deliberations done in this paper provide a step by step development of a BSC and illustrates a variety of goals, links of cause and relationships, evaluation criteria, and measures within the context of an Austrian beverage producing company's strategy regarding its e-Business strategic positioning. The e-Business deployment was an overall success with a few minor shortfalls in the areas of content actualizations and system downtime, both due to technical problems, and expected end consumer utilization. The calculated BSC was regarded as suitable for supervising the e-Business environment and the associated strategic goals by business management.

## 1. Introduction

The Balanced Scorecard (BSC) was first proposed in 1992 by [9] and soon after applied [11]. Today the BSC is a well established measurement method which links strategic objectives and performance measures across four different perspectives. In addition, the application of the BSC promises strategy mapping between each of the perspectives. The idea of a BSC is to find a set of measures that maintain a balance between short- and long-term objectives, between lagging and leading indicators, between financial and non-financial criterions, and between internal and external performance perspectives [10, 18].

The usefulness of the BSC method was shown in a variety of different settings such as for university [12], national health service [18], banking [13], public [7], and other sectors [3, 5, 20, 21]. Furthermore, [22] conducted a systematic comparative research to relate the value of the BSC, and the value of specific elements of it, to the context of the application. They concluded that the BSC appeared to be of value to all ten organizations analyzed (although in varying degrees). A critical reflection of the BSC can be found in [2, 17]. Some scientists question the concept itself [24]. They are pointing out that the BSC is not an elaborated system but a framework, respectively

diagnostic system, of performance measurement.

The BSC was also applied in the IT area, e.g. for strategic information systems [14], and in the ERP context [19].

This paper seeks to analyze an e-Business development, which is a task characterized by business process integration and automation issues [4, 8], and its performance with a BSC adapted to the special situation faced in the underlying company. Firstly, we will present an adoption of the general purpose BSC to the case of analyzing an e-Business implementation. Thereafter, the adapted BSC is calculated with the empirical data of the underlying case study. We conclude with implications on the usefulness of the BSC for e-Business performance analysis and the results of the BSC calculation for the case study.

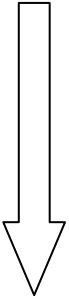
## 2. An e-Business BSC

The original BSC proposed by Kaplan and Norton consists of four different perspectives: the financial perspective, the internal business process perspective, the customer perspective, and the learning and growth perspective [9].

Attempts to adapt the BSC to evaluate e-Business, either as a system or subdivision of an organization, have extended the traditional perspectives [6, 15, 16]. An important extension is the partner viewpoint, which takes into account the special role of diverse partners in e-Business environments, especially for e-Procurement. Another addition can be an implementation perspective, where project based evaluation criteria are pooled. This extension accommodates the complexity and difficulties observed, when introducing e-Business solutions to companies.

Table 1 shows the mentioned perspectives and illustrates the cause and effect relationship between them. Apparently, all e-Business aspects should ultimately have an effect on financial measures. Because the e-Business solution was already implemented in the case study, we have excluded the introduction perspective in the following analysis.

**Table 1. e-Business perspectives, and cause/effect relationship**

	e-Business System Implementation and Usage	Introduction/Implementation Perspective Learning and Growth Perspective
	e-Business Potentials	Internal Business Process Perspective Partner Perspective Customer Perspective
	Financial Effects	Financial Perspective

### 3. Case Study

In our case the BSC was calculated ex post 2.5 years after the e-Business system was deployed. All relevant information for this time period was available. In future, the BSC will be applied as an IT controlling instrument.

#### 3.1 Company Background

The analyzed enterprise is a large Austrian beverage producer. The different brands are either distributed by food chains such as Billa or Merkur, or by catering companies. Thus the enterprise depends to a considerable degree on the successful co-operation with these partners. Sales are enforced by expensive marketing strategies especially to sustain and further improve the image of the corporation.

#### 3.2 e-Business Deployment

The initial e-Business system was launched in the year 2000 and represented an internet-based information system for partners and customers as well as an area dedicated only to business partners. The information on products and the company itself was stored in up to 10 different languages and can be edited by an overall editorial system.

The deployed e-Business system therefore supports Business to Business (B2B), Business to Consumer (B2C) and Consumer to Business (C2B), and Intra-business (Organization Unit to Organization Unit) communication.

#### 3.3 Discounted Cash Flow (DCF) Analysis

A DCF analysis was undertaken prior to defining the BSC and 2.5 years after e-Business deployment for a time period of five years. Therefore, most of the considered factors were quantified exactly for the past 2.5 years, while all of them had to be estimated for the next 2.5 years.

The purpose of the DCF analysis was to identify and evaluate the predicted future cash flows resulting from the E-Business investment and discount them with an appropriate interest rate. The DCF analysis can of course not take into account important intangible benefits, such as an improvement of the company's image. Nevertheless, the application of the DCF analysis showed us

the criteria and their observed, respectively estimated, values which directly influence the financial aspects of the underlying investment. Two main areas of application potentials were identified: The level of e-Business utilisation by end consumer and business partners as well as improved process efficiencies. It was assumed that the level of achievement for each potential rises over time starting by 60% in the first year.

The DCF analysis yielded a negative net present value of the e-Business investment of -10,000 €, which would have suggested a rejection of the investment. Recent papers have shown, that the use of DCF based analysis alone does not suffice to assess the benefits involved IT decisions [23]. Newer IT applications such as e-Business solutions seek to provide a range of benefits including many intangible factors which can not be fully assessed by traditional methods such as the DCF based analysis [18].

#### 3.4 Strategic Goals

The company aimed to achieve its competitive advantage by both operational efficiency and strategic positioning. The company defined the following primary objectives while making the e-Business adoption decision:

- Elimination of the e-Business gap to competition
- Establishment of a technological base to enable future e-Business developments
- Improvement of the image and awareness of the enterprise in the market place
- Creation of a permanent contribution to an increase of sales
- Improvement of communication (more efficient, error free, easier)

#### 3.5 Strategic Goals for each BSC Perspective

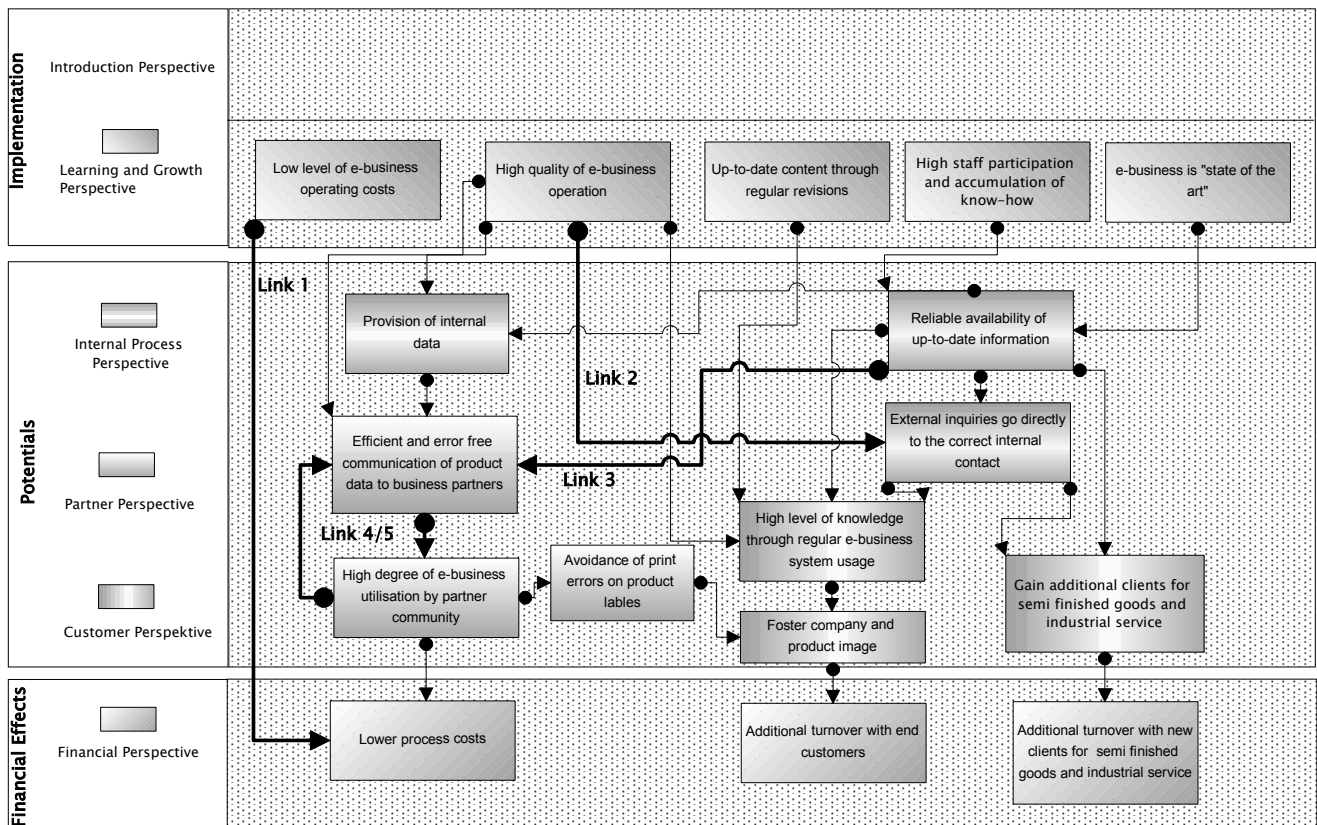
The strategic goals determined by the company prior to e-Business adopting need to be extended for every BSC perspective. It is essential to have a common understanding of the company's strategy and the e-Business technology to achieve profound and well-defined goals related to each BSC perspective.

For the *Learning and Growth Perspective* the following goals were defined:

- e-Business system is „state of the art“
- High quality of e-business operations
- Low level of e-Business operating costs
- Up-do-date content through regular revisions
- High staff participation and accumulation of know-how

For the *Internal Process Perspective* the following goals were determined:

- External inquiries go directly to the correct internal contact



**Figure 1. Chains of cause and effect between the determined e-Business goals**

- Reliable availability of up-to-date information
- Provision of internal data

For the *Partner Perspective* the following goals were stated:

- High degree of e-Business utilization by business partner community
- Efficient and error free communication of product data to business partners
- Avoidance of print errors on product labels

For the *Customer Perspective* the following strategic goals were defined:

- Foster company and product image
- High level of knowledge in the end customer community through regular E-Business system usage
- Gain additional customers for semi finished goods and industrial service

To the *Financial Perspective* three final goals were added:

- Lower process costs
- Additional turnover with end customers
- Additional turnover from new clients for semi finished goods and industrial service

### 3.6 Chains of Cause and Effect

The BSC analysis also involved the forging of chains of cause and effect between the previously determined goals. Figure 1 illustrates the resulting network. Below we have extracted a few examples of the essential links identified:

**Link 1:** E-business processes are supposed to cause lower process costs than traditional business processes. Therefore by substituting traditional processes for e-business processes the overall process costs are reduced.

**Link 2:** It is assumed that high quality e-business solutions allow to redirect customer inquiries directly to the correct internal contact, represented in this case by a specific e-mail addresses.

**Link 3:** Only through reliable availability of the e-business system and information provided, it is possible to communicate product data to business in an efficient manner.

**Link 4/5:** The efficient and error free communication and the e-Business utilisation level depend on each other. Link 5 indicates that only if the system works properly it will be accepted by business partners as an alternative to sending printed product catalogues, e-mails or CD's. At the same time Link 4 assumes that the potentials of the e-business system can only be fully exploited if the system is used by nearly all business partners.

**Table 2. Goals, their assignment to different perspectives, metrics, and levels of achievement**

Perspective	Strategic Goals	Measures	Achievement
Learning and Growth	Low level of e-Business operating costs	e-Business supplier costs	Green
		Errors with content updates in the business partner area	Yellow
	Up-do-date content	Amount of update activities	Yellow
	High staff participation and accumulation of know-how	Number of employees with unrestricted entrance to the editorial system	Green
	e-business is „state of the art“	Age of editorial system	Green
Process	External inquiries go directly to the correct partner	Forwarding of inquiries	Green
	Reliable availability of up-to-date information	Downtime per month	Yellow
Partner	Business partner community: High level of knowledge through regular E-Business system usage	Inquiries with problems and questions as well as unnecessary mailings	Green
		User sessions	Green
		Downloads	Green
		New registrations	Green
Customer	End customer community: High level of knowledge through regular E-Business system usage	User sessions	Yellow
		Downloads	Yellow
		New customer requests	Green
Financial	Lower process costs	Costs for ISDN despatch	Green
		Effort for transmitting product data and pictures over traditional channels	Green
	Additional turnover with end customers	Valuation of end customer sessions	Yellow

### 3.7 Chosen Measures and Levels of Achievement

In Table 2 the chosen measures to clarify the achievement of goals are presented. Those metrics are linked to the determined strategic goals, which again are assigned to the different perspectives. It has to be noted, that some assignments in the BSC framework could have been defined differently. The chosen measures needed to be quantifiable (by cost-effective means), easy to understand and should reflect the identified chains of cause and effect [10, 18]. Therefore, it was not possible to account for every determined strategic goal in the framework, what can be seen as a drawback of the BSC approach.

For each of the used measures the company had to set the desired targets, which also reflect the final goal level to be achieved at the end of the strategic planning rhythm. For our case the level of achievement (green, yellow, red) is illustrated in Table 2 in the last column. As can be seen, there are no red markings, the e-Business components seemed to be more or less operating as planned. Some

problems were detected in updating and changing product information especially in the business partner section of the system. Those problems were based on data import problems between the AS400 and the e-Business server. Furthermore, the system downtime would need to be reduced to further improve reliability (as suggested by introducing a server cluster). Finally, the end consumers were expected to pay more attention to the new system. This shortfall was identified by a number of measures in the customer and financial perspectives. A possible reaction would be to increase the content extent and quality by more updates on a more regular base.

The achievements of undertaken actions should then be further evaluated and controlled by the continuous application of the BSC.

## 4. Conclusion

The management of the analyzed company regards the BSC as suitable for supervising their e-Business system and communicating their associated strategic goals. It

will be used as information-gathering tool on a regular basis serving to keep the management informed about the achievements of their system and could be extended for further business infrastructure management in the future.

A clear strength of the BSC is being an easily understood concept, which merges a set of measures contributing to the determined strategic goals under different perspectives.

The main weakness of the BSC is that it does not represent an elaborated, consistent and uniformly applicable system. Applying BSCs applied in other settings implies the risk, that not enough attention is paid to specific strategic goals and in succession to the companies' strategic position. Every BSC is per definition unique to the company involved.

Next, not all goals can be translated into measurable objectives in quantitative terms. Literature suggests, that in such cases, it is important to relate these attributes to other ones that can be quantified. This is not always possible, respectively does not in general uncover the level of achievement for the specific goal. Therefore, not all determined goals could be incorporated in the BSC. For example, the achievement of various quality related goals were too difficult to quantify on a regular basis. Also, the goal of attaining a better corporate image through the e-Business deployment seemed too difficult to assess within the BSC. The assessment of missing criteria will nevertheless be undertaken, outside of the BSC approach, leading to the application of more than one management tool. We have found little research on consolidating the results from different management tools into a consolidated view apart from [1]. It seems that the 10 year old BSC concept is still not fully developed.

Due to the fact, that we have undertaken an ex post analysis, the development of strategic programs based on the selected measures for achieving the strategic goals was not included. The company will define those strategic programs in order to attain the targets for the next strategic planning cycle.

## References

- [1] Abran, A. and Buglione, L. A multidimensional performance model for consolidating Balanced Scorecards. *Advances in Engineering Software*, 34 (6). 339-349.
- [2] Ahn, H. Applying the Balanced Scorecard Concept: An Experience Report. *Long Range Planning*, 34 (4). 441-461.
- [3] Denton, G.A. and White, B. Implementing a Balanced-scorecard Approach to Managing Hotel Operations: The Case of White Lodging Services. *The Cornell Hotel and Restaurant Administration Quarterly*, 41 (1). 94-107.
- [4] Erasala, N., Yen, D.C. and T.M., R. Enterprise Application Integration in the electronic commerce world. *Computer Standards & Interfaces*, 25. 69-82.
- [5] Forret, M.L. and Sullivan, S.E. A Balanced Scorecard Approach to Networking: A Guide to Successfully Navigating Career Changes. *Organizational Dynamics*, 31 (3). 245-258.
- [6] Friedag, R. and Schmidt, W. *Der Controlling Berater - Sonderausgabe: e-Controlling*. Haufe Verlag, Freiburg, 2001.
- [7] Irwin, D. Strategy mapping in the public sector. *Long Range Planning*, 35 (6). 637-647.
- [8] Johannesson, P. and Perjons, E. Design principles for process modelling in enterprise application integration. *Information Systems*, 26. 165-184.
- [9] Kaplan, R.S. and Norton, D.P. The Balanced Scorecard – measures that drive performance. *Harvard Business Review*. 71-79.
- [10] Kaplan, R.S. and Norton, D.P. *The Balanced Scorecard - Translating Strategy into Action*. Harvard Business School Press, Boston, Mass., 1996.
- [11] Kaplan, R.S. and Norton, D.P. Putting the Balanced Scorecard to Work. *Harvard Business Review*. 134-147.
- [12] Lawrence, S. and Sharma, U. Commodification of Education and Academic LABOUR--Using the Balanced Scorecard in a University Setting. *Critical Perspectives on Accounting*, 13 (5-6). 661-677.
- [13] Littler, K., Aisthorpe, P., Hudson, R. and Keasey, K. A new approach to linking strategy formulation and strategy implementation: an example from the UK banking sector. *International Journal of Information Management*, 20 (6). 411-428.
- [14] Martinsons, M., Davison, R. and Tse, D. The balanced scorecard: a foundation for the strategic management of information systems. *Decision Support Systems*, 25 (1). 71-88.
- [15] Müller, A. and Thienen, L.v. e-Business-Controlling mit der Balanced Scorecard. in Blomer, R. and Bernhard, M. eds. *Balanced Scorecard in der IT, Praxisbeispiele - Methoden - Umsetzung*, Symposion Publishing GmbH, Düsseldorf, 2002, 183-209.
- [16] Müller, A. and Thienen, L.v. *e-Profit: Controlling-Instrumente für erfolgreiches e-Business*. Haufe Verlag, Freiburg, 2001.
- [17] Norreklit, H. The balance on the balanced scorecard a critical analysis of some of its assumptions. *Management Accounting Research*, 11 (1). 65-88.
- [18] Protti, D. A proposal to use a balanced scorecard to evaluate Information for Health: an information strategy for the modern NHS (1998-2005). *Computers in Biology and Medicine*, 32 (3). 221-236.
- [19] Rosemann, M. and Wiese, J., Measuring the Performance of ERP Software – a Balanced Scorecard Approach. in *Australasian Conference on Information Systems*, (1999), 774-784.
- [20] Rouse, P., Putterill, M. and Ryan, D. Integrated performance measurement design: insights from an application in aircraft maintenance. *Management Accounting Research*, 13 (2). 229-248.
- [21] Sandstrom, J. and Toivanen, J. The problem of managing product development engineers: Can the balanced scorecard be an answer? *International Journal*

*of Production Economics*, 78 (1). 79-90.

[22] Southern, G. From Teaching to Practice, via Consultancy, and then to Research? *European Management Journal*, 20 (4). 401-408.

[23] Taudes, A., Feurstein, M. and Mild, A. Options Analysis of Software Platform Decisions: A Case Study. *MIS Quarterly*, 24 (2). 227-243.

[24] Weber, J. and Schäffer, U., On the way to active management of performance measures. in *Performance Measurement 2000—Past, Present and Future*, (Robinson College, Cambridge, 2000), 672–679.