Balanced Scorecard vs Standard Costing

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Abstract A management control system (MCS) is a system which gathers and uses information to evaluate the performance of different organizational resources like human, physical, financial and also the organization as a whole in light of the organizational strategies pursued. The development of strategy maps and Balanced Scorecards has transformed the foundation of management control systems. Costs of managerial control system can be significantly reduced when found common framework for its various instruments. The aim of paper is to establish communication between the Balanced Scorecard and Standard costing as an instrument of management information systems. It is proposed to use a variance analysis for the changes in the financial position as the metrics for perspectives of Balanced Scorecard. The possibility of using accounting balance equation and double entry for the perspectives of Balanced Scorecard also shown.

Keywords: balanced scorecard, standard costing, strategic variance analysis, changes in financial position

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1. Introduction

Accounting is the process of recording, classifying, summarizing, reporting and interpreting information about the economic activities of an organization. As well as an information system is a formal process for collecting data, processing the data into information, and distributing that information to users. The purpose of an Accounting Information System (AIS) is to collect, store, and process financial and accounting data and produce informational reports that managers or other interested parties can use to make business decisions. Although an AIS can be a manual system, today most accounting information systems are computer-based.

Both MIS (Management Information System) and AIS are information systems based on computers that are very helpful for organizations towards keeping their records properly. AIS is a division of MIS and is all about a system of maintaining the entire accounting, sales and purchase records, financial statements, and other transactions. It is very helpful in organizing the account system in an organization. It is true that AIS is very helpful in judging the previous performances and it plays a vital part is deciding the actions the future projects. However the financial information is not enough to maintain the success of any operation. Any management needs information that AIS simply cannot provide.

The design of an effective measurement systems have proven very challenging, particularly in light of the dramatic change of the business and manufacturing environments we have witnessed during the last three decades or so. Traditional, financially based performance measures were, at best, unable to cope with the requirements of the new environment (Shank & Govindarajan, [10]). Kaplan & Johnson [3] argue that these financial measures are "too late and too aggregate to be of use to managers". They further argue that these financial measures were misleading by distracting managers away from real problems.

Any management information system may consist of a set of accounting and management tools, which forms the portfolio or tool kit. The more instruments in the set, the greater the cost of developing and supporting information system. Therefore, the search for the common ground of different tools is a practical interest from the point of view of cost reduction and theoretical interest in terms of identifying the general nature of those or other tools. The success of the accounting information systems is largely due to the format of data storage, based on double-entry accounting. Using a double entry accounting in the management information system can reduce the cost of its development and support.

The aim is to identify the nature of the accounting Balance Scorecard, including the use of balance equation, accounting double entry, standard costing, and Statement of changes in financial position.

2. Literature Review

From the point of view of the objectives of the work we are interested in research in several directions. Firstly it research related to the cost information. Overview of approaches and models are given, for example, in works of A. Haug et al [2] and A. Mutze & D. van Ierland [8]. The second area of research is to review the practice of application management tools (CIMA [6], D. Rigby & B. Bilodeau [9]). The third line of research involves the search for similarities and differences between various managerial and accounting tools: TD-ADC vs ABC (R. Kaplan & S. Anderson [5], BSC vs TDB (M. Souissi [12]), ABC vs ABM (G. Cokins & S. Căpuşneanu [1]. Target

Costing vs other managerial tools (H. Sharaf-Addin et al [11]) and other works.

Finally, the last line of research related to the profit variance analysis (Shank & Govindarajan, [10]) or strategic variance analysis as a strategic perspective on a common cost management tool.

A Strategic Variance Analysis (SVA) is a management tool used to establish reasons for differences in a firm's operating income between two time periods – reasons that may not always be apparent from the financial statements (Mudde, P. A., & Sopariwala, P. R. [7]). SVA allows management to determine, in the form of performance variances, changes in operating income resulting from changes in sales volume, sales prices, costs per unit of activity, productivity and capacity utilization.

Our approach is similar to the latter approach because the Statement of changes in financial position and Income statement gave got a close connection.

Our research concerns the relationship between The Balanced Scorecard and traditional accounting frameworks.

In 1992, Robert S. Kaplan and David P. Norton introduced the balanced scorecard, a set of measures that allow for a holistic, integrated view of business performance. The scorecard was originally created to supplement "traditional financial measures with criteria that measured performance from three additional perspectives—those of customers, internal business processes, and learning and growth" (Kaplan and Norton 1996, [4, p. 75]).

By 1996, user companies had further developed it as a strategic management system linking long-term strategy to short-term targets. The development of the balanced scorecard method occurred because many business organizations realized that focus on a one-dimensional measure of performance (such as return on investment or increased profit) was inadequate. Too often, bad strategic decisions were made in an effort to increase the bottom line at the expense of other organizational goals. The theory of the balanced scorecard suggested that rather than the focus, financial performance is the natural outcome of balancing other important goals. These other organizational goals interact to support excellent overall organizational performance.

The Kaplan and Norton balanced scorecard looks at a company from four perspectives:
• Financial: How do we look to shareholders?
• Internal business processes: What must we excel at?
• Innovation and learning: Can we continue to improve and create value?
• Customer: How do customers see us?

By viewing the company from all four perspectives, the balanced scorecard provides a more comprehensive understanding of current performance.

Robert S. Kaplan and David P. Norton's concept of balanced scorecard revolutionized conventional thinking about performance metrics. By going beyond traditional measures of financial performance, the concept has given a generation of managers a better understanding of how their companies are really doing.

3. Methodology

Balanced Scorecard (BSC) is one of the performance measuring tools due to performance drivers. Improving the efficiency (performance) means moving the company to a higher level, which is associated with an increase in value of the company by increasing its capital.

The capital increase is measured by the change in the financial condition of a certain period, primarily due to the net profit. The Company may increase its own capital as long as you want, and each year a profit at the same level, if not changed external or internal environment. The change in the financial condition is measured simply by subtracting the initial statement of the final statement (the difference between the two balance statements), and is effected in the Statement of changes in financial position (Cash flows statement or Statement of changes in working capital).

However, the company can wish to change their internal environment, business processes or improve the company's image among its customers.

In this case there is a variance in financial position (Statement of changes in financial position) during comparing the usual changes and the changes that occur as a result of certain performance activities.

In our opinion, it is this variation in changes in financial position, can be measured through the BSC perspectives. BSC should have a close relationship with accounting. The key word in this context is the word "balance." Balance requires a causal phenomena that are associated with the method of accounting double entry. In this sense, the BSC perspectives can be considered as elements of the financial statements.

The causal link between the BSC perspectives through their performance indicators in this context can be considered as accounts.

Therefore, the balanced scorecard is actually used in standard costing.

In our opinion, the balanced scorecard (BSC) proposed by Kaplan and Norton, in fact, is a system that produces the appearance of the desired variance for all types of costs and revenues.

4. Results

Let's consider the basic accounting equation which connects the assets, liabilities and capital:

$$A = L + C$$

This equation is known to arise from the definition of equity as the difference between assets and liabilities, and which is otherwise called as the net assets i.e.

$$NA = C \qquad (1)$$

This equation must be maintained after any financial transaction.

Let's fix the value of capital (net assets at the beginning of a certain period).

At the end of the year as a result of the transaction there is a change in the financial position of the company compared with the beginning of the year. This change in accordance with Accounting Standards describes the Statement of changes in working capital (cash flow statement). When such activity is a regular change in the financial position measured one and the same quantity. If the company does not plan to increase or decrease the volume of its activities, this amount can be withdrawn

from the company, such as the payment of dividends. This constant unvarying activity can be called stationary, because after payment of dividends financial position (balance sheet) at the beginning and end of the period will be the same.

The use of the Balanced Scorecard, as well as other systems of strategic planning lead to a breach of a stationary, that, in fact, is the change (variance) in the financial position before and after the introduction of the new strategy. We will use the term " variance".

Further reasonings we will carry out the example of the production operations of the company.

Add and subtract a summand $Cm_o \cdot M_o$ on the left side of the equation (1), which is the product of the unit price of the purchased material in the stationary statement of enterprise (before the implementation of a balanced scorecard).

$$NA + Cm_o \cdot M_o - Cm_o \cdot M_o = C \qquad (2)$$

From the point of view of mathematics at such operation does not change the equation. From the viewpoint of the accounting this transaction is written as shown in Figure 1:

Account Inventory	Debit $Cm_o \cdot M_o$	Credit
Account payable		$Cm_o \cdot M_o$

Figure 1. Usual double entry

Let's suppose that as a result of the implementation of the BSC the company plans to reduce the purchase price to the value Cm_p , that is less than Cm_o . Let's magine the amount of $Cm_o \cdot M_o$ as:

$$Cm_o \cdot M_o = (Cm_o - Cm_p) \cdot M_o + Cm_p \cdot M_o \qquad (3)$$

In terms of accounting, this means an attempt to reflect the change in inventories, and liabilities in connection with the new purchase price. The last two summand on the left side of equation (2) can be represented with regard to (3). Then on the left side of the equation will be two summands $(Cm_o - Cm_p) \cdot M_o$ with different signs. A summand with a minus sign will be moved to the right side of the equation (2).

In terms of accounting the expression $(Cm_o - Cm_p) \cdot M_o$ on the right-hand side of the equation represents the increase in the value of future financial result (profit), and on the left side - increase in net assets due to the appearance of lesser liabilities to suppliers.

Mathematically, the same can be obtained by adding and subtracting the left- side of the equation of (2) value $Cm_p \cdot M_o$.

Thus, after the implementation of these reforms the equation (2) can be transformed to the following form:

$$NA + (Cm_o - Cm_p) \cdot M_o + Cm_p \cdot M_o - Cm_p \cdot M_o$$
$$= C + (Cm_o - Cm_p) \cdot M_o \qquad (4)$$

From the viewpoint of the accounting transaction can be written as shown in Figure 2:

Account Inventory	Debit $Cm_p \cdot M_o$	Credit
Account payable		$Cm_p \cdot M_o$
Increase the future financial results		$(Cm_0 - Cm_p) \cdot M_0$
Increase (saving) asset (cash) is due to the lower material costs	$(Cm_0 - Cm_p) \cdot M_0$	

Figure 2. BSC oriented double entry

Our aim in this record is a representation of the reasons for the increase of the financial result, in this case, by saving asset. This notation is similar to the transaction record on buying material in the standard costing, which usually looks like:

Account Inventory	Debit $Cm_n \cdot M_n$	Credit
Account payable		$Cm_a \cdot M_n$
Direct material price variance		$(Cm_n - Cm_a) \cdot M_n$

Figure 3. Standard cost oriented double entry

The index n and a represent respectively standard and actual value.

The difference in the above two accounting records that in standard costing materials are recorded in debit on a standard price and the Accounts payable –on a fact price . Therefore, there is a difference, which is reflected in the account «Direct material price variance». If the actual price is lower than the standard price, such a value is called a positive variance, or else - negative. This is a positive or negative variance eventually at the end of the period is usually charged to the income statement.

Unlike standard costing in which the accounts payable is carried at actual cost and there is only one account for variation entry the difference between the amounts recorded in the debit of materials and credit of payments to suppliers, we propose to use two variance accounts with different types of balance, but the same amounts . One of them is traditionally associated with the financial result and the second reflects the future growth of the net assets. It can be called "The increase (maintaining) the asset (cash) due to the decrease in accounts payable." This account in the traditional accounting and standard costing does not exist. However, we propose to introduce it to reflect the link between standard costing and BSC as one of the variances in the BSC due to the financial result (financial perspective), and the second with the asset (customers or perspective business processes perspective).

For the standard costing, eventually, by variance account charged to the financial result, the value of which will coincide with the financial result using the method of actual costs. For the purposes of the BSC, we will "collect" these variances to reflect the effect of achieving the planned indicators.

The BSC approach in determining the perspective price is tentatively scheduled to save the asset, such as money that would be spent for the payment of accounts payable at the usual price of the material

For simplicity, we will use mathematical operations, sometimes commenting their accounting content.

Now add and subtract on the left side of the equation (4) a double summand $Cm_p \cdot M_p$, which is the product of the perspective price of the purchased material and its planned quantity for the production.

$$NA + (Cm_o\text{-}Cm_p) \cdot M_o + (M_o - M_p) \cdot Cm_p$$
$$+ Cm_p \cdot M_p - Cm_p \cdot M_p \qquad (5)$$
$$= C + (Cm_o\text{-}Cm_p) \cdot M_o + (M_o - M_p) \cdot Cm_p$$

The third term on the right is associated with the growth of the future financial performance through more efficient use of the materials, and the corresponding term in the left side due to the economy with the purchase of the asset less quality of materials for the same volume of output.

The final accounting entry with the effect of price and volume of the used material can be written as:

Account Inventory	Debit	Credit
	$Cm_p \cdot M_p$	
Account payable		$Cm_p \cdot M_p$
Increase the future financial results		$Cm_o \cdot M_o - M_p \cdot Cm_p$
Increase (saving) asset (cash) due to the smaller amount of purchased material	$(M_o - M_p) \cdot Cm_p$	
Increase (saving) asset (cash) is due to the lower material price	$(Cm_o - Cm_p) \cdot M_o$	

Figure 4. BSC perspectives`s oriented double entry

Note that the difference between $Cm_p \cdot M_p$ and $Cm_o \cdot M_o$ can be expressed in two ways:

$$Cm_o \times M_o\text{-}Cm_p \cdot M_p = (Cm_o\text{-}Cm_p) \cdot M_o +$$
$$+ (M_o - M_p) \cdot Cm_p \qquad (6)$$

or

$$Cm_o \cdot M_o\text{-}Cm_p \cdot M_p = (Cm_o\text{-}Cm_p) \cdot M_p +$$
$$(M_o - M_p) \cdot Cm_o \qquad (7)$$

Most textbooks recommend to calculate a price variance of materials through the product of the difference between the standard and the actual price and the actual quantity of the materials used, not the standard one.

If your organization uses this approach, the variance that occurs due to simultaneous changes in price and use of the material, is a variance of the price of the material. This approach is explained by the fact that an employee of the purchasing department is responsible for the performance of all purchased materials, whether justified if these materials are then used by the production departments.

This combined variance associated with activities such as the purchasing department and manufacturing department, i.e. associated with business processes.

In terms of the BSC we are not interested in changes in the financial position at the end date, which is described by equation (5), and the variance on the same date on the stationary financial condition of a perspective one.

Let we have identified a perspective price and quantity of material used. Then after purchase the required amount of raw materials needed in production, we can write the balance equations for stationary and perspective situations.

$$A + Cm_o \times M_o = L + Cm_o \times M_o + C$$
$$A + Cm_p \times M_p = L + Cm_p \times M_p + C$$

Subtracting the second equation from the first one can be obtained

$$(Cm_o\text{-}Cm_p) \times M_o + (M_o - M_p) \times Cm_p$$
$$= (Cm_o\text{-}Cm_p) \times M_o + (M_o - M_p) \times Cm_p \qquad (8)$$

The left side of equation (8) is a savings asset, due to lower costs for materials related to the price and efficiency of use. Really, sales of finished products and the disposal of an asset (cost of goods sold) due to the lower its cost, bringing the same income. Therefore, the right side of (8) is connected with the financial result and not with liabilities.

Indeed, it can be assumed that the positive summand $Cm_p \cdot M_p$ in the left-hand side of equation (5) is not raw materials, but the materials that are already in the finished product. This summand can be written as $Cm_{pq} \cdot Q$ where Cm_{pq} is the share of promising direct material costs in the unit cost of the finished product, Q is the number of units of finished products to be sold. Note that the index Q is absent, as we consider the situation in which usual sales coincides with the perspective.

For a more accurate representation of the fact that the right-hand side of equation (8) shows the variance in financial result, not the liabilities, to replace this expression with the above in mind.

$$(Cm_o\text{-}Cm_p) \cdot M_o + (M_o - M_p) \cdot Cm_p$$
$$= (Cm_{oq}\text{-}Cm_{pq}) \cdot Q \qquad (9)$$

The left side of this equation is the variance of the net assets and the right side of the variance in the financial results related to the variance of the direct material costs.

The process of converting raw materials into finished products with the subsequent sale may take a considerable period of time, but the operating cycle is much smaller compared with the terms of achieving strategic objectives in accordance with the BSC.

In the classical standard costing with a more efficient use of materials in progress remain unused materials. In our case, we purchased a quantity of material that needs to go completely the manufacture of products, i.e, there are no stocks of unfinished production.

For the classical standard costing more efficient use of materials results in the unused materials in process. In our case, company purchases a quantity of material that needs to complete the manufacture of products, i. e, there are no stocks of work in process.

In the future, we will use not the absolute characteristics of the financial position condition and the variance in the example of the equation (9). In contrast, changes in financial position, which is actually due to the difference between the financial statement at the end and

beginning of the period, a variance in the financial position, we will understand the difference between stationary and future financial position.

We write the analog of equation (9) for direct labor costs

$$(Cw_o\text{-}Cw_p)\cdot T_o +(T_o - T_p)\cdot Cw_p$$
$$=(Cw_{oq}\text{-}Cw_{pq})\cdot Q \qquad (10)$$

Here Cw_o, Cw_p are the usual and perspective tariff rates of direct labor for one hour of work, and T_o, T_p are the usual and perspective times per unit of production, and Cw_{oq}, Cw_{pq} are parts of the usual and perspective direct labor costs in the unit cost of the finished product.

The right side of equation (10) represents the change in the financial result due to direct labor costs, where the first term on the left side - savings / overruns of resources (assets) related to the introduction of a perspective rate of hourly wages, and the second term - to increase / decrease the labor effectiveness (elapsed time).

Add the equation (10) to (9)

$$(Cm_o - Cm_p)\cdot M_o +(M_o - M_p)\cdot Cm_p +(Cw_o -$$
$$- Cw_p)\cdot T_o ++(T_o - T_p)\cdot Cw_p =(Cq_o - Cq_p)\cdot Q \qquad (11)$$

here Q is usual / perspective output, $Cq = (Cqm + Cqw)$ is a production cost per unit that is the sum of direct material and direct labor costs per unit produced and sold products, which are determined by the formula.

$$Cqm = Cm \times \frac{M}{Q}, Cqw = Cw \times \frac{T}{Q}$$

At this stage of production overheads, including depreciation will not be taken into account.

P_o, P_p are respectively usual and prospective sales price per unit of output, $P_p \cdot Q, P_o \cdot Q$ are the corresponding revenue. We add the expression $(P_p - P_o)\cdot Q$ to both sides of the equation (11).

$$(Cm_o - Cm_p)\cdot M_o +(M_o - M_p)\cdot Cm_p +(Cw_o -$$
$$- Cw_p)\cdot T_o +(T_o - T_p)\cdot Cw_p +(P_p - P_o)\cdot Q = \Delta Pr \qquad (12)$$

Here ΔPr is variances in income (excess profit, taking into account the introduction of BSC over usual profit), which is determined by the formula.

$$\Delta Pr =(P_p - P_o)\times Q -(Cq_p - Cq_o)\times Q \qquad (13)$$

Let's introduce the following notation in the equation (12)

$$Pc = (Cm_o - Cm_p)\cdot M_o +(P_p - P_o)\cdot Q$$
$$Pb = (M_o - M_p)\cdot Cm_p +(Cw_o - Cw_p)\cdot T_o$$
$$Pd = -(T_p - T_o)\cdot Cw_p \qquad (14)$$
$$Pf = \Delta Pr$$

Here Pc, Pb, Pd, Pf are the values that can be associated respectively with the perspectives of customers, business processes, innovation and growth, as well as finance.

Note that we have term Pd with a minus sign, compared with perspectives Pc and Pb because the perspective of innovation and growth may be associated with an increase in wages and lead to a negative deviation. For example, hiring more skilled workers should lead to a positive variance in the use and price of the material, i.e, a positive value customer and the business processes perspectives.

Equation (12) in terms of prospects BSC can then be written as

$$Pc + Pb = Pd + Pf \qquad (15)$$

Thus, by analogy with the accounting equation perspectives of customers and business processes can be considered an analogue of the asset, the financial perspective is precisely the variance of results, ie, It is associated with its own capital.

How valid is the linking of the perspectives of innovation and growth with human capital, leave is beyond this study.

Since the left-hand side of equation (15) is an analog of the assets and the right side - an analogue of liability plus own capital, then operation entries or a balanced relationship between perspectives for the BSC can be carried out similar to the rules of accounting balance and double entry.

Debit	Credit
Increase Pc	Decrease Pc
Increase Pb	Decrease Pb
Decrease Pf	Increase Pf
Decrease Pd	Increase Pd

Figure 5. Double entry for Increase / Decrease BSC perspectives

The main difference between the transaction entries in the accounts and the perspectives accounts is the fact that the first accounts reflected on the absolute amount, but the second – on the variances. All of the concepts related to the accounting entries also apply to perspectives accounts.

Note that the direct operation as:

$$\text{Increase Pc} \,(\text{Debit})-\text{Increase Pd} \,(\text{Credit})$$

can have a duration of time as to achieve growth indicators related to customer relationship, you must first carry out an investment in innovation and growth, i.e.,

$$\text{Decrease Pf} \,(\text{Debit})-\text{Increase Pd} \,(\text{Credit})$$

And then the following operation must be performed:

$$\text{Increase Pc} \,(\text{Debit})-\text{Increase Pf} \,(\text{Credit})$$

Account Pf in this case is a control account which may reflect such a difference in time.

This gap in time reflects the special role of the BSC, which links strategic objectives with tactical tasks. That is, to move the company from one statement to another (defined mission and vision) that are established indicators BSC as either absolute or relative parameters that must be changed in steps over a period, reaching the set value by the end of the period of strategic transition. After that, the company can again operate normally, but on another level.

Therefore, we can say that the relationship between strategy and tactics according to the MTP is shown in this process step by step, clear to all participants.

In order to reflect the incremental nature of the relationship between strategy and tactics of the target can

be expressed by the words "to reduce the price of raw materials purchased by 5% every year for N years."

Often companies are not willing to publicly display the absolute values of each of the perspectives, so we can talk about relative terms, such as price reduction on the purchase of raw materials by 5%.

Note that each of the prospects of the Balanced Scorecard can only appear when the company planned to move to a new state.

5. Conclusions

Since the standard costing system is a product of the general accounting system, between BSC accounting as there is a connection. Perspectives for the BSC are variances in the elements of financial statements and can be run in accordance with the accounting rules of the recording in the accounts.

In this sense, the BSC is a system of standard costing, focused for a longer time compared to the classical. By analogy with the accounting balance equation, perspective clients and business processes can be considered analogous to the asset. The financial perspective is precisely the variances of results, that is associated with its own capital. The perspective of innovation and growth is associated with human capital. That is to say, the perspective of customers is an increase in net assets as result of relations with suppliers and customers; the perspective of business processes is an increase in net assets due to internal business - processes; development perspective is an increase in human capital; finance perspective is an increase in equity due to profits.

It seems logical to include these four perspectives, as one of them is related to the financial results, the second - with the production process within the company, while the other two - with external parties (customers, suppliers, or government) and employees of the company, ie by the company's operations, while which occurs receivables or payables.

Balance equation in terms of perspectives leads to the possibility of applying the rules of accounting double entry for the perspective indicators of BSC using debit and credit of accounts (indicator of perspectives for BSC). The essential point is that the balance equation is assessed on a gross basis.

The standard costing the cost centers are opposed to each other. For example, if the actual direct material costs were higher usual costs, the reason may be the high price of raw materials or inefficient use of the materials. Responsible for this is the different responsibility centers (supply department or pant). For example, the purchasing department has decided to buy the raw material of lower quality at a lower cost, which has increased the volume of raw materials used. BSC establishes closer causal relationship between various the cost and the responsibility centers, which soon leads to cooperation rather than confrontation between these centers.

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