

# Empirical Verification of the Performance Measurement System

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## INTRODUCTION

Ebm-papst Group is Germany's most sustainable company which has a global sales network and is worldwide innovation leader in electric fans and motors. The Ydria Motors LL Company (YM) is a member of the ebm-papst group and is organized as a competence center that produces and develops machines, appliances and AC and EC electric motors and exports as much as 98% of its production. The company is wholly owned by the ebm-papst group (Ydria Motors, 2015).

Practical experiences with the Performance Measurement System (PMS) show that it is difficult to determine transparent relations between the different perspectives. However, the implemented PMS doesn't enable the identification of all information on the relations (i.e. causalities) between process Key Performance Indicators (KPIs). In this manner company doesn't have transparent evaluation of resource inputs in efficiency of the implemented model in the management system (Janeš & Dolinšek, 2010; Waruhiu, 2014). In the light of its development, the company has to resolve the issues to outline its future organic growth. Thus, the YM Company has already faced the challenge of setting the KPIs, which are the central theme of represented research.

Primarily, the represented research is focused on the layout of the balanced scorecard (BSC) i.e. it's causal relations, using qualitative and quantitative methods. In this case study, the company's business performance sustainability understanding, which is based on comprehensive data tests and semi-structured interviews with managers, contributed to the selection of Engle-Granger

two-step method for assessment of the error correction mechanism between the KPIs.

## BACKGROUND

One of the main purposes of implementing PMS is to communicate strategy throughout the organization. Among the number of PMS approaches, a dominant position was achieved by Kaplan and Norton's BSC; it has emerged as a new synthesis between the traditional financial-accounting system and efforts to achieve long-term competitive ability. The BSC system considers the traditional financial KPIs as well as leading KPIs of future performance. In this way, it provides key information about the activities of managers. The BSC is a PMS theorized by Kaplan and Norton which was first created as a performance measurement tool, which has later evolved into a PMS, and has subsequently become a comprehensive strategic management system (Barnabè, 2011; Janeš, 2014).

Measurement of the organization's performance represents a good practice and is an integral part of the organization's management in the accomplishment of its strategies and objectives. The BSC and associated KPIs are treated in practice as a process that supports the reviewing and changes of the measurement system in relation to changes in the business environment of the organization.

Given the framework of the strategy map, which consists of four perspectives, and within them a large number of related strategic objectives, the added value of the business processes is manifested in the form of chains of cause-effect relations ranging from nonfinancial and quantifiable KPIs in the

learning and growth perspective via processes and customers to a finance perspective (Waruhiu, 2014; Kaplan, 2012, p. 543). Cause-effect relations can be understood as a set of hypotheses that are taken to meet the strategic objectives. A strategy map is a diagram that describes how an organization creates value by connecting strategic objectives that are in explicit cause-effect relations with each.

Approach of setting practical objectives is being performed through a series of approximations. Keeping the maximization of the rate of return as the stakeholder's long term value, companies usually develop a number of subsidiary objectives which contribute in different ways to improvement in the return and which are also measurable in business practice. A company which meets high performance in most of its objectives will enhance its long-term rate of return. But it cannot be proved that the result will be a maximum possible overall return. Namely the problem of reconciling claims of conflicting objectives is common across all sectors. In business practice company's objectives are what the company wants from its key stakeholders. Essential nature of company objectives makes a logical connection between what stakeholders want from a company, i.e. "strategic factors", and what the company wants from its stakeholders, i.e. "organization objectives". Both sides together provide real strategy framework. For example one of the stakeholder groups represents customers from which company wants to achieve profitable revenue. If an objective is an expression of what an organization wants from a key stakeholder, it must involve behavior by a stakeholder and, a desired behavioral outcome (Kenny, 2012, pp. 42-43). Once developed, strategic objectives will shape an organization's strategies effectively, leading to sustainable success. It's important to remember that targets on organization objectives shape strategies; they also provide a means of assessing the effectiveness of those strategies. Namely, without clear and quantified objectives, any strategy can be set (Kenny, 2012).

One of the main areas that both the relevant literature and Kaplan and Norton themselves

identified as being critical, is related to the identification and assessment of causal relations which are essential within the BSC (Barnabè, 2011; Barnabè & Busco, 2012; Kaplan, 2012; Nørreklit, 2000; Waruhiu, 2014, p. 119). In this context, the causal relations have been in the center of survey interest, because they are providing better relations model between the four BSC perspectives (Bukh & Malmi, 2005, p. 96).

## CASE DESCRIPTION AND DISCUSSION

### Methodology

The research project of empirical verification of the PMS was performed as a single case study of modeling the BSC system for a manufacturing company and founded on the complementary use of quantitative and qualitative methods (Gummeson, 2000, p. 88). For this purpose, were obtained and used KPIs that were already monitored by the company on a monthly basis and ranges from 2005M01 to 2011M12. Since the exact legalities between the observed KPIs were not known, the information contained in the time series of observed KPIs were expressly applied. Based on the selected Engle-Granger two-step method, a framework for the layout of the BSC including EVIEWS statistical software was defined (Engle & Granger, 1987). The central part of the case study is the part in which the empirical evaluation of the BSC's layout with the Engle-Granger two-step method was performed. Before starting with the Error Correction Model (ECM) modeling, several basic statistic tests of the KPIs' time series, i.e. stationarity and cointegration, were performed in order to exclude the possibility of false regression (Engle & Granger, 1987; Granger, 2004; Hassouneh, Serra, & Bojnec, 2015).

The main objective of the research aimed at developing a quantitative approach that would be complementary with a qualitative approach of the BSC layout. For this purpose a single equation

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