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Could the balanced scorecard enhance pharmaceutical organisations’ quality performance?

Rasha Mahmoud Elkanayati and Rania Shamah

Abstract
Purpose – The purpose of this paper is to investigate the relationship between balanced scorecard (BSC) attributes and quality performance and the possible moderating effect of quality performance on the relationship between BSC and business performance. The positive findings from the multinational pharmaceutical organisations in Egypt may help the national pharmaceutical companies to improve their performance when incorporating the same tool (BSC) in their quality management system.

Design/methodology/approach – This research employs a quantitative approach to conduct a survey, and empirical data were drawn from 28 multinational pharmaceutical organisations in Egypt, 125 correct questionnaires were used for further analysis, and the research model was tested using the structural equation modelling technique by analysis of moment structures software.

Findings – The findings of the empirical research reveal that the BSC attributes significantly and positively relate to quality performance where strategy translated to operations has the strongest relationship, providing feedback/learning and communication have a moderate relationship, whereas alignment relation is negligible in the presence of other attributes. Additionally, BSC attributes have a significant positive relationship with business performance directly and indirectly and quality performance is the moderator. Also, the research suggests that the quality performance has a significant and positive relationship with business performance.

Research limitations/implications – The overall research implication is that the BSC certainly acts as a ground foundation for consolidating the quality management system. The BSC practices presented in this research emphasise that this tool is not just an integration of financial and non-financial metrics that measure performance; rather, it is a performance management system that reinforces the quality system and helps to harmonise the strategy and goals that leads to improvement in the performance levels.

Practical implications – The study shows that BSC practices support the organisational quality/business performances. Therefore, managers must develop and continuously refine their strategies, allocate sufficient resources for achieving targets of strategic measures, in order to achieve superior business performance.

Originality/value – Several studies approached the effect of some of BSC attributes on quality performance; yet, this research considers the association between the four attributes collectively with quality/business performance. Additionally, no previous research has comprehensively studied the moderating effects of quality performance on the relation between BSC and business performance, especially in pharmaceutical companies in Egypt.

Keywords Business performance, Quality performance

Paper type Research paper

1. Introduction

In today’s international business environment, knowledge-based organisations are comprised entirely of intangible assets, whereas tangible assets have become less critical. It is well recognised that these intangible assets like quality, customer relationships and new drug design create value within organisations. However, traditional financial measures are not suitable for measuring their performance. Hence, there was a need for creating different performance measurement systems (PMS) (Soderberg, 2006) like integrated PMS (Nanni et al., 1992), Balanced scorecard (BSC) (Kaplan and Norton, 1992) and performance prism (Neely et al., 2002). This research will focus on the most popular and widely adopted PMS, namely, BSC.
The primary purpose of this research is to empirically determine the relationships between four BSC attributes (strategy–alignment–communication–feedback/learning), and quality/business performances in multinational pharmaceutical organisations operating in Egypt, where the BSC tool is extensively used, and to statistically analyse the results to realise the structural model that illustrates the interrelationships. The positive findings from this research will motivate the national public and private pharmaceutical companies to employ the BSC tool in their quality management system to accomplish similar positive results.

Accordingly, the following research questions are the primary interest of this research:

RQ1. What is the relationship between BSC attributes and quality performance?
RQ2. What is the relationship between quality performance and business performance?
RQ3. Does quality performance moderate the relationship between BSC and business performance?

The remainder of this paper is organised as follows: Section 2 discusses the literature review of the research variables, and the relationship between them, and the subsequent generation of the research hypotheses. Section 3 is a description of the research methodology, and the next section is a presentation of the statistical analysis of the data. Section 5 is an outline of the findings and discussion and, finally, the last section provides the conclusion for the research, managerial implications, followed by limitations and future work recommendations.

2. Literature review and hypotheses development

2.1 Literature review of research variables

2.1.1 Balanced scorecard. The BSC is a multi-dimensional measurement system that is widely adopted in the international business environment. It was first created by Kaplan and Norton in order to counteract the limitations that developed from the use of financial performance indices only for performance measurement (Kaplan and Norton, 1992, 2007). The founders of the BSC realised that the financial measures worked well as diagnostic tools for the industrialisation era but will not be appropriate for the competitive nature of the coming era. Later, Niven (2006) added that the former studies criticised financial measures claiming that they are irrelevant to many levels of the organisation and that they affect the organisations’ ability to add value. BSC is a performance reporting system that is aligned with the organisations’ strategic goals and incorporates both financial and non-financial measures derived from the company’s strategy and linked together through driver–outcome (cause and effect) relationships. Furthermore, Kaplan and Norton proposed the use of the indicators across four interrelated perspectives: financial, customer-internal processes, learning and growth perspectives, to establish a holistic view for the overall company’s performance, with an ultimate goal of achieving long-term financial results. Over the last two decades, the BSC was widely adopted by institutions as a successful PMS, and later as a strategic management system.

An extensive review of the literature revealed that several studies reported that many organisations adopted BSC (Chan and Ho, 2000; Speckbacher et al., 2003); yet, most studies involve organisations in the USA and Europe, whereas little is known about its use in Egypt, particularly in the pharmaceutical sector. A desire to address this issue is the motive for this research.

Balanced scorecard attributes. Next is a summary of four different attributes associated with BSC use as identified in the previous literature.

A – strategy translated into operations. The strategy is defined as “The starting point for corporate behaviour, it expresses an organisation’s ambitions, sets out its chosen direction and describes the principal initiatives and projects necessary to achieve its mission” by Simon et al. (2008). After consensus is being met for the organisations’ strategies, it is fundamental to translate lofty vision statements into operational terms that are understandable to people at the lower level. People need to understand how their self-productivity from daily activities expressed into an integrated set of objectives and measures contributes to strategy success (Kaplan and Norton, 2007). Next, Kaplan and Norton (1998) denoted that the set of measures are distributed over multiple
perspectives to ensure measures are well balanced between external measures like operating income and internal measures like new product development. After strategy and drivers are identified, Kaplan and Norton (2007) stated “The scorecard influences managers to concentrate on improving or re-engineering those processes most critical to the organisation’s strategic success. That is how the scorecard most clearly links and aligns action with strategy”.

Furthermore, a very important aspect of a successful scorecard is a well-depicted strategy map, which is according to Kaplan and Norton (2000) a visual representation of the company’s critical objectives, and the relationships among them which enable employees to understand the link between their tasks and how their activities are coordinated together to achieve the organisational goals. The maps show the cause and effect relationships, by which improvements of certain measures will result in desired outcomes, for instance, how better employee capabilities will increase customers’ retention and eventually increase revenues. Afterwards, changes in internal and external environment obligate necessary changes for strategy and objectives (Feurer and Chaharbaghi, 1995), an effective PMS collects data on the effectiveness of the operations, the suitability of the strategy and whether objectives are being met (Neely et al., 1995; Suwignjo et al., 2000).

B – alignment of strategy. Alignment refers to creating corporate synergies. A successful PMS exhibits a diversity of performance measures and is characterised by a measurement system aligned with the strategy and value drivers that lead to the achievement of goals and strategic success (Chenhall, 2005; Ittner and Larcker, 2001). Ittner et al. (2003) stated that alignment helps organisations to achieve better performance by closing the gap between what is actually measured and what needs to be measured, hence, providing a rapid strategy assessment. Also, Chenhall (2005) added alignment direct performance towards organisational goals by reducing ambiguity towards required actions, determining priorities and setting expectations, additionally Kaplan and Norton (2007) stated “The scorecard gives managers a way of ensuring that all levels of the organisation understand the long-term strategy and that both departmental and individual objectives are aligned with it”.

C – strategy communication. BSC that ensures high-level scorecards is cascaded down the organisational levels so that the strategy becomes a tool for everyone; strategic objectives and measures are translated to operational activities relevant to each particular group. More important, linking the targets to individual performance and reward system yields personal cards so that every employee understands and is committed to strategy success (Kaplan and Norton, 2007). Also, Assiri et al. (2006) argued the importance of communication to employees to facilitate their understanding and commitment to mission, vision, values and strategy.

D – providing feedback and learning. The initial requirement of a successful PMS is to derive performance measures from the organisational strategy; these strategic measures’ primary use is to assess the implementation of the strategy. Regular meetings should be held to compare the measures to establish targets, suggest remedial actions and plan for the implementation of these actions (Bourne et al., 2000). Further information from the measures can be used to refine the strategy and to challenge the strategic assumptions; also Julnes and Holzer (2001) confirmed that this information is used further for strategic planning, resource allocation, operational management, and reporting to top managers and stakeholders. The BSC offers a specific mechanism that consolidates this kind of learning that is often missed in other tools where all this information could be fed into the scorecard allowing for modifications and continuous strategic refinements (Kaplan and Norton, 2007). In the same context, Simons (2000) argued that a successful PMS should act as an interactive tool that gathers information related to strategic uncertainties. Feedback offers employees timely and accurate information about quality performance and about manufacturing operations which is fundamental for corrective management (Flynn et al., 1994). Moreover, Kloot (1997) added that information related to internal performance and external environment should be readily available to enable double-loop learning. For considering the development of the strategy, Garengo et al. (2005) confirmed that strategy and PMS must be separate but interrelated so that PMS reflects priorities of the strategy and, meanwhile, informs the strategy development process so that strategy is continuously developed together with the measures of the measurement system.
2.1.2 Quality performance. Quality performance is a reflection of perfection, consistency, adherence to standards and procedures, considering the customer as a priority, providing reliable products, and elimination of waste (Liu and Xu, 2006). In several studies, quality performance is considered as a sub-construct of financial performance or operational performance, thereby this has led to neglecting the operationalization of quality performance as a dependent construct (Soares et al., 2017). However, more studies suggested researching quality performance as a separate construct that is different from financial, business and operational performance, like Sousa and Voss (2002) who called for the importance of differentiating between quality performance and operational performance that could be attained when scholars define the multi-dimensional nature of quality performance like the following.

Taguchi (1986) and Garvin (1988) operationalized quality performance into product quality and process quality. Netland and Sanchez (2014) employed the same measures, whereas Zeng et al. (2013) operationalized quality performance as the conformance of product quality only, and Fynes and Voss (2002) dimensionalized quality performance as internal and external quality performance. Interestingly, the most agreeable method in measuring quality performance is the method applied by Brah et al. (2002), where quality performance is composed of four primary indicators, product quality, process quality, employee performance and supplier performance, in addition to two secondary indicators, employee satisfaction and customer satisfaction. This operationalization aligns with the strategy of using the BSC in assessing the performance of the organisation holistically without missing any of its aspects. For these reasons, the same method for operationalizing quality performance will be used in this research.

After extensive review of the literature, quality performance is usually associated with total quality management (TQM) implementation (Talib et al., 2013; Prajogo and Sohal, 2003; Patyal et al., 2017), supply chain management practices (Soares et al., 2017), entrepreneurial orientation and innovation (Ndubisi and Agarwal, 2014), product quality and environmental accounting (Dunk, 2002) and organisation culture (Corbett and Rastrick, 2000). Surprisingly, to my knowledge, almost no research works were carried out to investigate the relationship between BSC implementation and quality performance, which represents a research gap. For this reason, this study is interested in filling this literature gap.

2.1.3 Business performance. Business performance is a broad term incorporating all concepts that consider the success of a company and its activities (Prasad et al., 2015). Previous literature viewed the business performance from two broad perspectives, either subjective that is related to the company’s performance in comparison to their expectations or competitors and objective perspective that relies on absolute measures of financial performance (Protcko and Dornberger, 2014). Another perspective, as given by Avella and Vázquez-Bustelo (2010), is where business performance is measured by the firm’s position with regard to its competitors through manufacturing performance (cost, quality, dependability and flexibility), marketing performance (market share and growth rate) and financial performance. Also, Ogbonna and Ogwo (2013) measured corporate performance through sales volume, profit and market shares. It is practically impossible through this research to employ the actual financial figures due to data confidentiality so for operationalizing business performance growth in sales and market share are used like Herrmann et al. (2010), Hajjat and Hajjat (2014) and Byukusenge et al. (2016).

2.2 The relationship between study variables and hypotheses development

2.2.1 The relationship between BSC and quality/business performances. Although not much evidence exists on the relationship between total BSC and quality performance, few studies have approached the impact of some BSC attributes on quality, for instance Zeng et al. (2013) who conducted their research to investigate the association between feedback, communication and quality performance, where a positive relationship was empirically validated. In a different attempt, Talib et al. (2010) highlighted a lack of empirical studies that relate strategy to quality performance or any other performance measure and cited two studies that verify the positive impact of strategy on quality performance (Terziiski, 2006; Prajogo and Brown, 2004) and also the research that
provided a structural model that would correlate strategy, communication and other TQM practices to quality performance and, yet, the research did not provide empirical results. Recently, empirical research by the researchers revealed that strategy and communication were insignificant to quality performance (Talib et al., 2013).

Thus, the literature above leads to the following hypotheses and sub-hypotheses:

- **H1.** There is a positive relationship between BSC attributes and quality performance.
- **H1a.** There is a positive relationship between strategy translated into operations and quality performance.
- **H1b.** There is a positive relationship between alignment of strategy and quality performance.
- **H1c.** There is a positive relationship between communication of strategy and quality performance.
- **H1d.** There is a positive relationship between providing feedback and learning and quality performance.

In a different context, according to De Geuser et al. (2009), BSC contributes positively to organisational performance; similarly, BSC was found to contribute to organisational and personal performance according to Zhijun et al. (2014), whereas regarding the BSC attributes' effect on business performance, feedback is associated with positive organisational performance according to Chenhall (2005); the research argued that performance feedback helps to clarify expectations, reduces ambiguity related to which activities lead to goals’ achievement and thereby contributes to improved organisational performance. Similarly, Simons (2000) confirmed that timely feedback acts as a diagnostic tool that warns of potential performance problems and, therefore, improves performance. This result is consistent with (Schäffer and Steiners, 2004) empirical results that feedback has a direct impact on organisational action, although it has a little impact on organisational learning, also, positive impact of self-provided information on performance is reported through Forza (1995), Flynn et al. (1995), Kaynak (2003) and Kim et al. (2012). Furthermore, several studies noted that effective communication improves organisation performance (Yusuf et al., 2007; Goris et al., 1973/2000). Strategy is associated with operational performance according to Feng et al. (2006) who performed a comparative research between Australian and Singaporean organisations and revealed that the strategic planning as a TQM practice is strongly associated with operational performance. Also, strategy is associated to organisational performance according to Macinati (2008). Conversely, strategic planning was found to be insignificant to perceived performance, according to Ittner and Larcker (1997). Later, Ittner et al. (2003) realised that greater measurement diversity is associated with higher stock market performance.

Thus, the literature mentioned above leads to the generation of the second hypothesis:

- **H2.** Quality performance moderates the relationship between BSC and Business performance.

### 2.2.2 The relationship between quality performance and business performance

"Quality improvements enhanced profitability through reductions in cost and increase of market share" (Su et al., 2008). It is also denoted that the fundamental roles of implementing quality are improving financial and operational performance, followed by gaining a competitive advantage in the competitive environment. The literature offered explanations for these relationships as Garvin (1984) explained that quality performance influences business performance through manufacturing and marketing ways. To emphasise, quality outcomes like a low percentage of defects reduces quality costs and allows for timely delivery of products that will contribute to reducing the total cost and thereby increases profitability that will eventually lead to a better financial performance (Kaynak, 2003; Zu et al., 2008). Also, high-quality products will enhance customer satisfaction that will lead to increased sales and market share of the organisations (Ahire and Dreyfus, 2000; Choi and Eboch, 1998); thereby, it can be argued that quality outcomes ultimately improve business performance. From the literature review, most researchers argue that quality performance is strongly correlated to a better business performance like Su et al. (2008) and Kaynak (2003). Others found that the direct effect of quality on business performance is
performance might be weak or irrelevant like Fynes and Voss (2002). Thus, the third hypothesis could be inferred from the literature as:

H3. There is a positive relationship between quality performance and business performance.

The hypotheses and sub-hypotheses are illustrated in the conceptual framework, Figure 1.

Figure 1 shows the proposed relationships between BSC attributes, quality performance and business performance.

3. Research methodology

The objective of this section is to explain the methodology chosen to provide an answer to the aforementioned research questions.

3.1 Sampling approach and data collection

The sampling approach used in this research is non-probability sampling (purposive or judgmental sampling) that is a technique where specific settings or persons are selected on purpose to provide information that cannot be obtained from others (Maxwell, 1996). In this research, multinational pharmaceutical companies that employ BSC for measuring their performance for at least one year were selected, constituting a number of 28 pharmaceutical companies. Next, seven types of managers were selected from the top, and senior managerial levels from operations, quality, clinical research, marketing and sales, financial, human resources and chief executive managers as answering this questionnaire requires in-depth knowledge of the overall performance measurements of the questioned company. Participants were expected to have participated at least twice in the organisation’s performance review meetings in the past 12 months. The questionnaires related to research sample were distributed to 200 respondents who were all contacted; however, only 140 questionnaires were completed. Next, data cleansing was carried out, where cases with missing data or conflicting data were excluded. Finally, a sample of 125 responses was considered through the course of this research constituting a response rate of (62.5 per cent). The detailed profile of respondents has been shown in Table I.

The questionnaires were disseminated through web-based data collection due to flexibility, low cost, lack of potential bias from interviewer-respondent and easiness of data collection from distant places. However, to increase the response rate of the survey personal interviews was employed, also to reduce the errors that emerge due to respondents’ misinterpretation of the questionnaire statements. In both cases, respondents were assured of complete confidentiality, whereby participants that were personally interviewed were given enough time to read and sign the consent form. A copy of the form was provided to each participant.
signing the form (refer to Appendix 1). Arabic version was provided when required and to ensure that the Arabic version is entirely meaningful the survey was translated to Arabic and, then, back-translated to English.

3.2 Design of the questionnaire

The questionnaire was designed using the Google questionnaire forms and was divided into three parts: Part I included preliminary information about the interviewee and their companies, and these questions were intended to make the participants feel relaxed and not suspicious about the content of the survey; Part II included information related to the BSC attributes used, and Part III included an assessment of the quality and business performances level as perceived by the respondents. Initially, the scale consisted of 24 items generated from the literature, out of which 14 items represented the BSC attributes as the independent variable and the remaining ten items the dependent variables, quality performance and business performance (refer to Appendix 2). All the questions were closed questions, where the respondents had to choose the most applicable answer related to their company, and this way the questions were easier and faster to answer. The returned questionnaires were analysed using analysis of moment structures (AMOS) v.23.

3.3 Measures

To operationalise BSC dimension as the independent variable, the measures were adapted from Soderberg (2006) and Shutibhinyo (2012, 2013). Whereby, BSC attributes were categorised into four sub-variables addressing (strategy, alignment, communication and double loop learning). Six questions were allocated to examine the degree to which the foundation of BSC strategic traits exists, these strategic traits were strategic objectives/measures, multiple perspectives and cause/ effect relationships among objectives and measures, and were assigned letters from x1.1 to x1.6 (refer to Appendix 2).

Two questions identified the extent of alignment between corporate strategy and business/ functional units’ strategies and were assigned letters x2.1 and x2.2, three questions were utilised

<p>| Table I Profile of respondents |</p>
<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of respondents</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of organization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 3 years</td>
<td>8</td>
<td>6.4</td>
</tr>
<tr>
<td>3–7 years</td>
<td>19</td>
<td>15.2</td>
</tr>
<tr>
<td>7–15</td>
<td>21</td>
<td>16.8</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>77</td>
<td>61.6</td>
</tr>
<tr>
<td><strong>Number of working employees</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer than 500 employees</td>
<td>41</td>
<td>32.8</td>
</tr>
<tr>
<td>500–999 employees</td>
<td>27</td>
<td>21.6</td>
</tr>
<tr>
<td>1,000–5,000 employees</td>
<td>19</td>
<td>15.2</td>
</tr>
<tr>
<td>5,000–10,000 employees</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>More than 10,000 employees</td>
<td>32</td>
<td>25.6</td>
</tr>
<tr>
<td><strong>Participants’ roles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations manager</td>
<td>26</td>
<td>20.8</td>
</tr>
<tr>
<td>Quality manager</td>
<td>17</td>
<td>13.6</td>
</tr>
<tr>
<td>Marketing and sales manager</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Clinical research manager</td>
<td>28</td>
<td>22.4</td>
</tr>
<tr>
<td>CEO</td>
<td>18</td>
<td>14.4</td>
</tr>
<tr>
<td>Financial/accounting manager</td>
<td>11</td>
<td>8.8</td>
</tr>
<tr>
<td>Human resources manager</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Last year financial report</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exceeded business goals</td>
<td>52</td>
<td>41.6</td>
</tr>
<tr>
<td>Met its business goals</td>
<td>48</td>
<td>38.4</td>
</tr>
<tr>
<td>Fallen short to meet business goals</td>
<td>23</td>
<td>18.4</td>
</tr>
<tr>
<td>Significantly fallen short to meet goals</td>
<td>2</td>
<td>1.6</td>
</tr>
</tbody>
</table>
to identify if the strategy is well communicated and understood by employees and were assigned letters from x3.1 to x3.3, and, finally, the overall feedback/learning variable was depicted through three questions and was assigned letters from x4.1 to x4.3, to verify if the strategy is linked to the budgeting process and whether strategy is continuously refined and improved.

Next, for measuring the dependent variables, quality and business performances, ten-item instrument was used. Quality performance was assessed through product quality, process quality (process variability, defective products, cost of quality and on-time delivery), employee performance, customer satisfaction and supplier performance as adapted from Brah et al. (2002) and was assigned letters from y1 to y8. Business performance was assessed through market share and sales increase as reported by Herrmann et al. (2010), Hajjat and Hajjat (2014) and Byukusenge et al. (2016) and was assigned letters z1 and z2. All the dimensions were assessed on a five-point Likert-type scale anchored on strongly agree to strongly disagree.

4. Data analysis

4.1 Reliability analysis

Testing the reliability of survey data is a pre-requisite for data analysis and inference. Reliability is broadly defined as the degree to which scales are free from error and, therefore, are consistent (Nunnally and Bernstein, 1994). On the contrary, validity determines whether the scale truly measures what it intends to measure. Cronbach’s coefficient $\alpha$ is the most commonly used estimator of test/scale reliability; however, it has been criticised as being a lower bound and, hence, underestimating true reliability (Peterson and Kim, 2013). Thereby, composite reliability (CR) is commonly used as a more accurate predictor of reliability and is usually calculated in conjunction with structural equation modelling (SEM). The current research uses Cronbach’s $\alpha$ and CR coefficients to test the reliability of each dimension, where the minimum acceptable value of Cronbach’s $\alpha$ is 0.6, whereas the minimum acceptable value of CR coefficient should not be less than 0.7 (Peterson and Kim, 2013; Raykov, 1997).

As illustrated in Table II, data analysis for the BSC constructs revealed that Cronbach’s $\alpha$ coefficient values are between 0.633 and 0.866 to demonstrate high reliability, whereas CR
coefficients range between 0.740 and 0.988 revealing high degree of reliability. Results show the explicit validity coefficients range between 0.796 and 0.930 that indicates high validity and ensures that the respondents understand the BSC attributes dimension correctly. For quality performance and business performance constructs, Cronbach’s α coefficients range between 0.864 and 0.906, and CR coefficients range between 0.884 and 0.930; also, the explicit validity coefficients range between 0.929 and 0.952 that indicates high reliability and validity.

4.2 Confirmatory factor analysis (CFA)

According to Marsh and Hocevar (1985), CFA is a special application of the SEM, which is also known as the linear structural relationship model (Jöreskog and Sörbom, 2004). This statistical method is used to find a small set of unobserved variables (latent variables) that can account for the covariance among a larger set of observed variables (exogenous variables) and is used to confirm the reliability and validity of measurement scales (Carmines and Zeller, 1979). The process of evaluating the measurement model resulted in keeping all the exogenous items based on the criterion that factor loadings should not be less than 0.5 (Byrne, 2013; Kaynak, 2003.

As revealed from Table III, all scale items of BSC attributes and performance measures CFA loadings range from 0.503 to 1.003 that exceeds the minimum threshold limit of 0.50; hence, the convergent validity of all measures is evident. Statements from x1.1 to x4.3 range from 0.503 to 1.003; therefore, it could be concluded that these statements as exogenous variables strongly express and measure the (latent variables) BSC attributes. Additionally, Table III demonstrates that standard estimate values of quality performance statements range between 0.652 and 0.891, whereas business performance statements range between 0.815 and 0.902; therefore, these statements as exogenous variables strongly express and measure the latent variables quality performance and business performance dimensions.

4.3 Convergent validity

Construct validity measures the extent to which the items in a scale assess the same multi-variate construct. The convergent validity is a sub-set of construct validity and is assessed by average

Table III

<table>
<thead>
<tr>
<th>Exogenous variables</th>
<th>Latent variables</th>
<th>Unstandardised estimate</th>
<th>Standardized estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>x1.1</td>
<td>Strategy translated to operation</td>
<td>1</td>
<td>0.537</td>
</tr>
<tr>
<td>x1.2</td>
<td></td>
<td>1.126</td>
<td>0.628</td>
</tr>
<tr>
<td>x1.3</td>
<td></td>
<td>1.976</td>
<td>1.003</td>
</tr>
<tr>
<td>x1.4</td>
<td></td>
<td>0.867</td>
<td>0.572</td>
</tr>
<tr>
<td>x1.5</td>
<td></td>
<td>0.606</td>
<td>0.570</td>
</tr>
<tr>
<td>x1.6</td>
<td></td>
<td>1.79</td>
<td>0.899</td>
</tr>
<tr>
<td>x2.1</td>
<td>Alignment</td>
<td>1</td>
<td>0.995</td>
</tr>
<tr>
<td>x2.2</td>
<td></td>
<td>1.007</td>
<td>0.976</td>
</tr>
<tr>
<td>x3.1</td>
<td>Communication</td>
<td>1</td>
<td>0.600</td>
</tr>
<tr>
<td>x3.2</td>
<td></td>
<td>0.86</td>
<td>0.535</td>
</tr>
<tr>
<td>x3.3</td>
<td></td>
<td>1.288</td>
<td>0.794</td>
</tr>
<tr>
<td>x4.1</td>
<td>Feedback and learning</td>
<td>1</td>
<td>0.522</td>
</tr>
<tr>
<td>x4.2</td>
<td></td>
<td>1.881</td>
<td>0.695</td>
</tr>
<tr>
<td>x4.3</td>
<td></td>
<td>0.648</td>
<td>0.503</td>
</tr>
<tr>
<td>y1</td>
<td>Quality performance</td>
<td>1</td>
<td>0.713</td>
</tr>
<tr>
<td>y2</td>
<td></td>
<td>0.964</td>
<td>0.706</td>
</tr>
<tr>
<td>y3</td>
<td></td>
<td>0.919</td>
<td>0.652</td>
</tr>
<tr>
<td>y4</td>
<td></td>
<td>0.862</td>
<td>0.715</td>
</tr>
<tr>
<td>y5</td>
<td></td>
<td>1.067</td>
<td>0.824</td>
</tr>
<tr>
<td>y6</td>
<td></td>
<td>1.166</td>
<td>0.891</td>
</tr>
<tr>
<td>y7</td>
<td></td>
<td>0.926</td>
<td>0.712</td>
</tr>
<tr>
<td>y8</td>
<td></td>
<td>0.897</td>
<td>0.731</td>
</tr>
<tr>
<td>Z1</td>
<td>Business performance</td>
<td>1</td>
<td>0.902</td>
</tr>
<tr>
<td>Z2</td>
<td></td>
<td>0.889</td>
<td>0.815</td>
</tr>
</tbody>
</table>
variance extracted (AVE) that identifies the average amount of variance in indicator variables that a construct is managed to explain. Hair et al. (2010) recommended that the CR of all measures needed to be above the minimum threshold limits of 0.70. As shown in Table IV, all the estimates demonstrate a high degree of convergence between the items with their respective constructs. Moreover, the CR should be greater than the AVE and AVE should be above the minimum threshold value 0.50 (Fornell and Larcker, 1981; Hair et al., 2010). As denoted from Table IV, all the factors of BSC practices and performances measures possess CR estimates that are greater than AVE values, in addition to AVE values that range between 0.525 and 0.971 for BSC and between 0.557 and 0.739 for performance constructs that indicate a high level of convergent validity.

4.4 Multicollinearity

Multicollinearity is the degree of correlation among independent variables. Independent variables are highly correlated among themselves if the correlation coefficient ($R$) is above 0.90 (Hair et al., 2010; Ringim et al., 2012; Green et al., 1988) and $R = 0.85$ is the threshold for the harmful effect of collinearity according to Elith et al. (2006). Pearson correlation was used to evaluate whether collinearity is problematic among the independent variables in this research. The results indicate correlation range between 0.167 and 0.834 that means collinearity does not threaten the validity of the regression equation.

4.5 Regression analysis

To verify the main hypothesis simple regression analysis was employed to study the impact of BSC use (independent variable) on quality performance (dependent variable). A positive correlation value (0.870) indicates that there is a significant correlation between BSC dimension and quality performance, the coefficient of determination ($R^2$) equals 0.757 that indicates that total BSC in the model explains (75.7 per cent) of any change in the quality performance dimension. Additionally, the $R^2$ value shows that the model is regarded as being suitable to be used for multiple regressions with the data through (SEM).

<table>
<thead>
<tr>
<th>Table IV</th>
<th>Average variance extracted for BSC attributes, quality performance and business performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed exogenous variables</td>
<td>Latent variables</td>
</tr>
<tr>
<td>x1.1</td>
<td>Strategy translated to operations</td>
</tr>
<tr>
<td>x1.2</td>
<td></td>
</tr>
<tr>
<td>x1.3</td>
<td></td>
</tr>
<tr>
<td>x1.4</td>
<td></td>
</tr>
<tr>
<td>x1.5</td>
<td></td>
</tr>
<tr>
<td>x1.6</td>
<td></td>
</tr>
<tr>
<td>x2.1</td>
<td>Alignment</td>
</tr>
<tr>
<td>x2.2</td>
<td></td>
</tr>
<tr>
<td>x3.1</td>
<td>Communication</td>
</tr>
<tr>
<td>x3.2</td>
<td></td>
</tr>
<tr>
<td>x3.3</td>
<td></td>
</tr>
<tr>
<td>x4.1</td>
<td>Feedback and learning</td>
</tr>
<tr>
<td>x4.2</td>
<td></td>
</tr>
<tr>
<td>x4.3</td>
<td></td>
</tr>
<tr>
<td>Y1</td>
<td>Quality performance</td>
</tr>
<tr>
<td>Y2</td>
<td></td>
</tr>
<tr>
<td>Y3</td>
<td></td>
</tr>
<tr>
<td>Y4</td>
<td></td>
</tr>
<tr>
<td>Y5</td>
<td></td>
</tr>
<tr>
<td>Y6</td>
<td></td>
</tr>
<tr>
<td>Y7</td>
<td></td>
</tr>
<tr>
<td>Y8</td>
<td></td>
</tr>
<tr>
<td>Z1</td>
<td>Business performance</td>
</tr>
<tr>
<td>Z2</td>
<td></td>
</tr>
</tbody>
</table>
Accordingly, $H1$ is accepted that there is a positive relationship between total BSC and quality performance at the significant level ($\alpha \leq 0.01$).

4.6 The structural equation modelling

The SEM is employed to arrive at the final model and test the hypothesised model, to determine the extent to which it is consistent with the data obtained from the sample. If the model fits the data then the model may be valid for the presumed relationships among the variables. On the contrary, if the model does not fit the data, then the hypothesised relationships are rejected as not tenable.

The model is built in the AMOS 23 Software. Figure 2 depicts the initial path diagram of SEM, where four rectangles represent the exogenous variables that are the four BSC attributes, two rectangles for the endogenous variables that are the moderator quality performance and the dependent variable business performance. Nine paths represented by unidirectional arrows indicate linear regression relationships, six bidirectional arrows represent the relationships between the variables and two residual terms (enclosed in circles E1: E2) that stand for the error variances.

Before modifying the model, the standardized regression weights ($\beta$) of all variable paths are between $-0.180$ and $1.117$ and some critical ratios (CR) are below 1.96 (which means that some paths coefficients are statistically insignificant at 95% confidence level). This initial saturated model needs to be improved to better fit the sample data as some of the model fit indices do not meet the criteria. For absolute fit measures, normed $\chi^2$ CMIN/df is over the acceptable ratio of 5, the adjusted goodness-of-fit index (AGFI) is less than the threshold of 0.90, the root mean square error of approximation (RMSEA) is greater than (0.1), and the Tucker–Lewis index (TLI) is below the threshold of 0.90 as well. After several trials using all the above criteria and the modifications indices to improve the accuracy of the findings, the decision was taken to remove the insignificant regression paths and add a path (E1 $\leftrightarrow$ E2) as recommended by the system to enhance the structural model.

After modifying the model, Table V shows the results and indicates that the structural model fits better with the sample data than the original model. It is easily noticeable that the standardized regression weights ($\beta$) of all variables paths are between $0.121$ and $1.169$ with all the CR above 1.96 that means that all the paths coefficients are statistically significant at 95%, 99% confidence levels. As shown below, the overall structural model demonstrates a good fit with the sample data, as supported by goodness-of-fit indices. For absolute fit measures, CMIN/df was 1.73, the adjusted AGFI was 0.905, RMSEA was 0.077 below the cut off value of 0.08 according to

![Figure 2](image.png)

**Figure 2** Framework for modelling structural equations/saturated or structural model (tested model)

**Notes:** Observed exogenous variables include independent variable dimensions (strategy, alignment, communication and feedback); observed endogenous variables include dependent variable business performance, and moderator quality performance; unobserved exogenous variables include the error variances
Hair et al. (2010). All the incremental fit indices, TLI, comparative fit index and incremental fit index are above the threshold of 0.90.

Figure 3 illustrates the final path diagram that reflects the significant paths of the final model. Non-causal associations between the traits of the independent variable are indicated by bi-directional arrows, whereas the linear causal associations are represented by unidirectional arrows.

The results of the proposed SEM analysis are also presented in Table VI. The three main hypotheses were all accepted, whereas among the four sub-hypotheses three were supported and one was rejected. The results demonstrated that strategy has a strong relationship with quality performance ($\beta = 0.620$, $p < 0.01$), supporting $H1a$. Furthermore, the results showed that feedback is associated with quality performance ($\beta = 0.265$, $p < 0.01$), supporting $H1d$, and communication has a weak relationship with quality performance, where $\beta = 0.129$ and $p < 0.05$ supporting $H1c$. However, alignment was depicted to have no relationship with quality performance where $\beta = -0.0$ and $p < 0.513$, refer to Table VI, suggesting the rejection of $H1b$.

**Table V** The final model, regression weights and critical ratios

<table>
<thead>
<tr>
<th>Paths</th>
<th>Regression weights ($\beta$)</th>
<th>SE</th>
<th>CR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y \leftarrow X1$</td>
<td>0.284</td>
<td>0.047</td>
<td>6.051</td>
<td>***</td>
</tr>
<tr>
<td>$Y \leftarrow X3$</td>
<td>0.644</td>
<td>0.066</td>
<td>9.761</td>
<td>***</td>
</tr>
<tr>
<td>$Y \leftarrow X4$</td>
<td>0.121</td>
<td>0.053</td>
<td>2.280</td>
<td>0.023</td>
</tr>
<tr>
<td>$Z \leftarrow y$</td>
<td>0.739</td>
<td>0.086</td>
<td>8.593</td>
<td>***</td>
</tr>
<tr>
<td>$Z \leftarrow x3$</td>
<td>1.169</td>
<td>0.076</td>
<td>15.368</td>
<td>***</td>
</tr>
</tbody>
</table>

Notes: Over fit measures (full model): absolute fit measures – CMIN/df = 1.73, $p$-value = 0.158; GFI = 0.986, AGFI = 0.905, RMSEA = 0.077; incremental fit measures – TLI = 0.985, CFI = 0.997, IFI = 0.997. ***Significant at $\alpha = 1$ per cent level.

**Figure 3** Adjusted framework for modelling structural equations

![Diagram showing the relationships between strategy, alignment, communication, feedback and learning, quality performance improvement, and business performance.]

**Table VI** Direct and indirect paths for BSC attributes dimension

<table>
<thead>
<tr>
<th></th>
<th>Standardized total effects</th>
<th>Standardized direct effects</th>
<th>Standardized indirect effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quality performance</td>
<td>Business performance</td>
<td>Quality performance</td>
</tr>
<tr>
<td>Strategy translated into operations</td>
<td>0.620**</td>
<td>0.081</td>
<td>0.620**</td>
</tr>
<tr>
<td>Feedback and learning</td>
<td>0.265**</td>
<td>0.035</td>
<td>0.265**</td>
</tr>
<tr>
<td>Communication</td>
<td>0.129*</td>
<td>1.049</td>
<td>0.129*</td>
</tr>
<tr>
<td>quality performance</td>
<td>0.000</td>
<td>0.716**</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Notes: *Significant at $\alpha = 5$ per cent level; **significant at $\alpha = 1$ per cent level, respectively.
It could also be inferred from Table VI that quality performance and communication are associated with business performance with a path coefficient \( (\beta = 1.032, p < 0.01) \) and \( (\beta = 0.716, p < 0.01) \), respectively. This result provides empirical evidence to support H3 that quality performance has a positive relationship with business performance.

Finally, strategy, feedback/learning and communication have a positive indirect relationship with business performance, whereas quality performance moderates these relationships; the path coefficients are 0.081, 0.035 and 0.017. These findings support H2 that quality performance moderates the relationship between BSC and business performance.

5. Findings and discussion

Overall, the results of the simple regression indicate that BSC practices are significantly and positively related to quality performance. Results from the SEM suggest that quality performance is significantly and positively correlated to business performance; additionally, SEM results suggest that strategy and feedback/learning practices are indirectly correlated to business performance with quality performance as a moderator, whereas communication is the only BSC attribute that is both directly and indirectly related to the business performance; these results provide an answer to the research questions that are previously mentioned in the Introduction section. Equally important, the association between the BSC tool, quality performance and business performance will act as a motive for the national pharmaceutical companies to incorporate the tool within their management system to measure and subsequently enhance the performance with an emphasis on the BSC practices that have the biggest significance.

The results support all the main hypotheses and most of the sub-hypotheses for the relationships indicated in the Literature Review section. Below is a detailed view of the hypotheses and how the results are interpreted in terms of the previous studies:

H1. There is a positive relationship between BSC and quality performance.

The results of the simple regression reveal that the total BSC attributes have a significant positive relationship with quality performance.

Regarding the sub-hypotheses:

H1a. Strategy translated into operations affects quality performance.
H1b. Alignment of strategy affects quality performance.
H1c. Communication of strategy affects quality performance.
H1d. Feedback and learning affects quality performance.

The regression weights \( (B) \) support that the three independent variables: strategy \( (x_1) \), feedback \( (x_4) \) and communication \( (x_3) \) have a significant positive relationship with quality performance, whereas the fourth independent variable: alignment \( (x_2) \) does not show a significant relationship with quality performance, so \( H1b \) is rejected, whereas the other three sub-hypotheses are accepted.

Although not much empirical evidence exists to support the relationship between total BSC on quality performance, a little number of studies investigated the impact of some of the attributes on quality performance. So, the research results are conforming to the findings of Zeng et al. (2013) that communication and feedback are associated with quality performance. Also, a significant link is found between strategic planning and quality performance as reported by Terziovski (2006) and Prajogo and Brown (2004). However, strategy and communication were insignificant to quality performance as reported by Talib et al. (2013):


Results from Table VI indicate that there is a significant indirect impact from strategy translated into operations, feedback and learning, and communication through quality performance (as a moderator) on business performance, where the standardized indirect effects are 0.081, 0.035 and 0.017, respectively.
Additionally, communication is the only attribute that has a significant positive relationship with business performance, where the standardized direct effect is 1.032, whereas the other attributes (strategy, alignment and feedback) do not directly relate to business performance.

These results are consistent with the findings of several studies that denoted effective communication influence the organisation to move systematically towards improved organisation performance (Ooi et al., 2007; Yusuf et al., 2007). Also, the findings of Shutibhinyo (2013) revealed all the BSC attributes were the sources of perceived benefits in various aspects, yet communication and strategy had the most significant impact, followed by alignment and feedback, respectively. However, the research by De Geuser et al. (2009) reported that strategy and feedback were the principal sources of overall improvement, whereas alignment and communication showed marginal impact:

H3. There is a positive relationship between quality performance and business performance.

Findings from Table V support the hypothesis, where the standardized total effect 0.716 identifies that quality performance has a significant strong relation with business performance. The findings comply with findings from Kaynak (2003), Zu et al. (2008) and Patyal et al. (2017) who studied the direct and indirect effects of quality practices on financial and market performance and endorsed a significant positive relationship. Likewise, several studies confirm that improving quality performance contributes to various aspects of business performance including financial, market, and innovation performance (Nair, 2006; Prajogo and Sohal, 2003; Sousa and Voss, 2002; Lai, Cheng and Yeung, 2005; Zu et al., 2008).

6. Conclusion

In response to RQ1, the finding from the simple regression provides empirical evidence that BSC practices significantly and positively correlate to quality performance. However, strategy appears to have the most significant correlation with quality performance, whereas feedback/learning and communication seem to have less contribution to the relationship and alignment of strategy has a negligible contribution. In response to RQ2, the findings from the SEM suggest that quality performance has a significant and strong positive relationship with business performance, in terms of both market share and sales margin. This suggests that the realisation of quality performance as a result of BSC implementation has led to enhanced business performance; hence, this provides additional evidence to the assumption that BSC is positively related to business performance, directly and indirectly, which is RQ3. Results from the SEM provide an answer to the third question that the BSC not only contributes directly to business performance but also has a contribution through BSC association with quality performance. This implies that the organisations that want to achieve improved business performance are encouraged to implement BSC in its management system as a prerequisite for achieving quality performance that will eventually lead to higher business performance as suggested by this research and previous studies such as Patyal et al. (2017) and Zu et al. (2008).

6.1 Training implications

The research provides an example of pharmaceutical companies using the BSC to assess their performance and manage their strategy, whereas significant outcomes indicate that these practices are associated with improved quality and business performance; thereby, public pharmaceutical organisations may use the significant positive findings of the research as a guide for evaluating and incorporating the BSC tool in their organisations’ quality management system after realizing top management commitment, clarifying strategy and goals, and providing additional training on performance measurement and BSC tool, in particular, for staff members followed by performance appraisal.

6.2 Research implications

The overall research implication is that the BSC certainly acts as a ground foundation for consolidating the quality management system. The BSC practices presented in this research emphasise that this tool is not just an integration of financial and non-financial metrics that measure performance; rather, it is a performance management system that consolidates the quality system and helps to harmonise the strategy and goals that leads to improvement in the performance levels.
6.3 Managerial implications

Managers would benefit from the current research and its results through establishing a well-defined strategy to their firms; furthermore, measures and objectives should be derived from the main strategy, distributed over multiple perspectives, whereby careful attention should be given to the diversity of performance measures through a balanced use of financial and non-financial measures; eventually, cause and effect relationships between measures and objectives should be established as a strategy map. Once these maps are constructed operations will be easily monitored and managed to achieve the sought after objectives and goals. It is also recommended that companies should set targets for their strategic measures and screen their resources and initiatives to achieve these results by linking their budgeting system to the PMS employed. Additionally, the results imply the significance of providing feedback and monitoring in delivering positive impacts on performance; hence, managers should ensure that the performance data to the PMS are timely, valid and reliable, which could be achieved through well-planned data sources, data collection and analysis procedures. Furthermore, reporting processed and analysed data to relevant individuals should be regular and timely to enhance performance.

Moreover, enough attention should be given to communicating strategy down the different levels of the organisations, a shared vision is also a strong influencer; hence, it is imperative that employees would develop a sense of responsibility for the objectives and targets related to their tasks that will motivate employees, enhance their performance and encourage them for achieving organisational targets. Also, linking the compensation and reward system to the people’s performance measures will intrinsically and extrinsically motivate employee and contribute to the strategy and firm’s success.

In conclusion, the empirical results provided by the current research would give confidence to the managers to implement the basic pillars of the BSC that acts as a distinctive competence that enhances organisations’ quality and business performances.

6.4 Research limitations and future research directions

Certain research limitations are discussed together with potential future work as follows: the data are collected through a mail survey questionnaire and structured personal interviews, and it is recommended that future research would extend this research using different methodologies like collecting qualitative data through field studies, case studies and unstructured interviews with the companies’ executives to obtain in-depth information about their effective use of BSC and to gain insight if other local companies would consider implementing BSC for performance measurement.

This research is a cross-sectional one and future research may focus on longitudinal design that will permit analysis of the possible changes over time and the relationships between the research variables over an extended period.

Third, the results of this research are limited to pharmaceutical organisations but it is recommended that other industries would examine if the structural model fits into their operations, which, in turn, may provide further validation of the proposed model.

Next, this research did not consider the number of BSC attributes implemented by organisations. Although some organisations have adopted all the attributes, others have adopted only one or a few. Therefore, comparative analysis of different adoption rates is recommended in future work.

Also, future research work may need to incorporate the influence of other moderating variables, such as the presence of other quality tools and other performance measures in the proposed conceptual model like R&D performance, competitive performance and innovation. It is also recommended that future researchers would consider investigating the effect of BSC attributes on financial performance using actual financial data whether data are readily available as this will provide concrete evidence on the effectiveness of BSC practices.

Eventually, future research may be pursued with a larger sample size to re-test the results of this research enhancing the statistical power to generalise the findings.
References


Appendix 1. Interview consent form

Research Title: Impact of Balanced Scorecard on Quality Performance

Name of the Researcher:

This survey is part of a master project sponsored by the Arab Academy for Science, Technology and Maritime Transport. The purpose of this research is to investigate the impact of performance measurement on quality performance. Your organisation experience to regularly measure and evaluate performance will be extremely valuable in informing this research on how to extract value from performance measurement systems.

We request that the most senior manager who has comprehensive knowledge of the performance measurement system and has participated at least twice in the organisation’s performance review meetings in the past 12 months complete the online survey questionnaire.

There are no risks associated with your participation but you have the right to discontinue participation at any time with no penalty.

This consent form is essential to ensure that you understand the need for your participation and that you agree to the conditions of participation. We require you to read carefully the conditions and sign the consent form.

1- I am voluntarily taking part in this project. I understand that I don’t have to take part and I can stop the interview at any time
2- My participation is voluntary and highly confidential, my name and company name will not be associated with the content of the research and the privacy of my answers will be protected.
3- I can request a summary report of the research findings
4- I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

Participant's Signature: Date:

Researcher's Signature:

If you have any further questions or concerns about this research, please contact:

Name of researcher:
Tel: E-mail:

Appendix 2. The impact of balanced scorecard on quality performance questionnaire

X – balanced scorecard attributes

- X1 – strategy translated into operations.
- X1.1 – there is a balanced use of financial and non-financial measures in our performance measurement system.
- X1.2 – there is a balanced use of driver/outcome measures in our performance measurement system.
- X1.3 – similar measures are grouped in the same perspective/dimension.
- X1.4 – our company business strategy is well defined.
- X1.5 – our company performance measurement system is derived from the business strategy.
- X1.6 – relationships and linkages between KPIs are well established in cause-effect relationships.
- X2 – alignment of strategy.
- X2.1 – business units’ and functional units’ strategies align with the company’s strategy.
- X2.2 – objectives and measures are disseminated throughout the company from the executive level to lower business level.
- X3 – communication of strategy.
- X3.1 – vision, mission and strategy are communicated throughout the company.
- X3.2 – our company entire workforce understands and is committed to vision, mission and strategy.
- X3.3 – our performance measurement system is linked to reward/compensation system.
- X4 – providing feedback and learning.
- X4.1 – our company budgeting system is linked to the performance measurement system.
- X4.2 – deviation from expected or planned results causes company’s management to question the business strategy.
- X4.3 – measures used by our performance measurement system is reviewed and assessed whenever our company’s strategy changes.

Y – quality performance
- Y1 – the quality of our product in comparison to other products in the industry has improved.
- Y2 – cost of quality (error, scrap, rework and inspection) as a per cent of total sales has decreased.
- Y3 – defects as a per cent of production volume have decreased.
- Y4 – process variability in your organisation has decreased.
- Y5 – delivery of your products and services has improved.
- Y6 – customer satisfaction with the quality of products and services has improved.
- Y7 – supplier performance in terms of reliability, competence and cooperation has improved.
- Y8 – employee performance has improved.

Z – business performance
- Z1 – sales margin has increased.
- Z2 – market share has increased.

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