

Performance Measurement and CG: New Perspective in Management Accounting

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Abstract

This study manages the required changes in PMSs to apply CG using *Institutional Theory*. The present study extends the scope of Institutional Theory by explaining how the change mechanisms impact to create and modify existing PMS. Therefore, a better understanding of the relationships between performance dimensions and CG factors in manufacturing companies is a key issue in this paper. Using Institutional Theory, this paper provides three change mechanisms result from CG; fairness, transparency, and responsibility. As well, a three factor model; *Input-Process-Output* is posited that comprises 15 measures of inputs, 13 measures of process and 12 measures of outputs. A questionnaire survey of 128 individuals was analyzed using statistical techniques. Furthermore, a case study is performed in an Egyptian company. The results show that there is a strong positive relationship between PMS and CG factors. Most of the individual measures in the proposed PMS have high importance. Further, there are significant differences between the degree of importance of input and output measures according to CG applying. Finally, the results of the case study prove the ability of the proposed model to shed light on the strength and weakness of organizational performance. This paper contributes to the performance measurement debate in manufacturing companies that implement CG practices. This study contributes to theory and practice by introducing a new perspective of PMS that explains the relationships between CG practices and the main dimensions of performance.

Keywords: PMS, CG factors, institutional theory, Input-process-output approach, Quality-Will, Egypt

1. INTRODUCTION

Performance Measurement System (PMS) is recommended for enhancing organizational performance (Franco-Santos et al., 2012). Building or refining a PMS that serves as an essential tool for assessing an organization progress in carrying out its mission is necessary. This paper aims to develop a PMS, using Institutional Theory, in response to the need for organizations to apply Corporate Governance (CG). Corporate Governance refers to the relationship among various participants in determining company's direction and performance. A strong CG should provide proper incentives for the board and management (led by the chief executive officer) to pursue objectives that are in the interests of the company, its shareholders and other stakeholders, and should facilitate effective monitoring. CG deals with the rights and responsibilities of a company's management, its board, shareholders and various stakeholders (CalPERS¹, 2004; OECD, 2004).

Recently, considerable attention has been devoted to examining the relationship between organizational performance and CG practices. However, most of the existing studies investigate whether the adoption of strong CG practices leads to improve performance or if firms with good performance adopt strong CG practices.

This paper has a different direction; it shows that strong CG requires appropriate performance measurement practices are applied in organizations. Therefore, the main purpose of this study is to provide a new perspective of a PMS that links between internal dimensions of organization and CG practices. This task is especially difficult because there is not a well-developed theory about the complex, multi-dimensional nature of CG or a conceptual basis for selecting the relevant governance characteristics to include in a PMS (Larcker et al., 2007). The absence of such clear theory leads to difficulty in specifying the appropriate structure of organizational performance. Therefore, this paper introduces an initial attempt to build a PMS by considering CG practices.

The motivations to this study are; firstly, Larcker et al. (2007) proved that the measurement error introduced by using a single indicator (e.g., percentage of external board members) for a complex construction (e.g., board independence) will almost certainly cause the regression coefficients to be inconsistent. Therefore, the use of multiple indicators can alleviate the measurement error associated with a single indicator. Similarly, econometric problems will be produced if a set of indicators is naively summed to form some types of governance index (e.g., the "G-score" used by Gompers et al. 2003). From this research point of view, a model of performance measurement with many measures and suitable for CG practices is developed in this study.

Secondly, the shortages related to Balanced Scorecard (BSC). BSC provides answers to four basic questions, namely (1) How will we look at our shareholders? (2) How must we look at our customers? (3) Which processes must we excel? (4) How must our organization learn and improve? (Kaplan & Norton, 2001a; 2001b). Although BSC is the most recent development system in performance measurement literature, it is only interested in shareholders, customers, and employees. However, organizations are under great pressure to deliver

¹ CalPERS refers to the California Public Employees Retirement System.

value to all stakeholders; they believe PMSs can help them in this task (Franco-Santos et al., 2012; Ittner & Larcker, 2001). On the other side, CG includes a complex set of relationships between an organization and its stakeholders, i.e. board of directors, management, shareholders, customers, and creditors. As well, from an agency perspective, the importance of strong governance stems from the need to align the interests of management with other stakeholders in the firm in order to reduce agency costs. When installing strong governance practices, companies can reduce agency costs and curtail this sub-optimal behavior. This should result in improved organizational performance (Cohen et al., 2002; Renders et al., 2010). From this point of view, this study develops a model that assesses an organization progress in carrying out its strategic objectives, takes into account CG practices, and includes various aspects of performance; the financial situation, operating performance, ownership, and company stakeholders (e.g. shareholders, board of directors, customers, suppliers, employees and investors). Therefore, a new comprehensive system will be created to measure performance in this study.

Thirdly, the remarks of some researchers, for example, Hoque (2013) noticed that some organizations find difficult to integrate the balanced scorecard with other managerial control tools, and that organizations have a tendency to use too many measures in a single scorecard. Hence, organizations might often end up with measuring the wrong things. Seal (2006) found that away from the responsibilities of auditors as external monitors, strong CG additionally requires that appropriate internal reporting and performance measurement practices are embedded in organizations. Melnyk et al. (2014) found that changes in either the business environment or business strategy (e.g. the adoption of CG) can lead to the need for new or revised measures and metrics.

This study contributes in the literature to introduce a new perspective of PMS that increases the understanding of CG practices and helps the firm to assess its progress. As well, it develops an overall PMS comprising multiple measures; financial and non-financial, short run and long run, as well as physical and moral measures.

This paper is planned as follows: Section 2 presents a literature review. Section 3 presents the theoretical development. Section 4 discusses research method, data collection, describes the sample, presents the results, and conducts a case study to apply the proposed model. A discussion of results is considered in Section 5. Finally, a summary of results and conclusion are presented in Section 6.

2. LITERATURE REVIEW

The management accounting literature is rich with research in PMSs. The earlier studies such as Barnabe & Busco (2012), Ittner et al. (2003), Kaplan & Norton (1992; 1996a; 1996b; 2001a; 2001b), Kraus & Lind (2010), Lipe & Salterio (2000), Malina et al. (2007), Norrekliit et al. (2012), and Valmohammadi & Servati (2011) found positive relationships between performance measures and organizational performance.

In spite of the rare literature that builds a PMS considering CG practices, many studies in the literature measure the effect of CG on organizational performance using different measures. For example, some studies investigated the effect of CG on the present organizational performance using firm's *market value* (e.g. Aggarwal et al., 2007; Doidge et al., 2007; Klapper & Love, 2004; Mitton, 2004). Other studies examined the effect of CG to predict organizational performance in the future (e.g. Cheung et al., 2011; Ertugrul & Hegde, 2009; Zhaka, 2014). Both of them found a positive correlation between organizational performance using market value as a proxy and CG. Their results showed that organizations that exhibit improvements in the quality of CG display a subsequent increase in market value, whereas organizations that exhibit deterioration in the quality of CG practices tend to encounter a decline in market value.

Some studies investigated the relationship between organizational performance and CG using *underpricing* as well as firm market value as indicators of performance (e.g. Boulton et al., 2009; Hearn, 2011). They investigated various governance mechanisms, i.e. levels of insider ownership (ownership by the directors/ownership by the founder), board size, founder retaining the CEO role, establishment of independent board committee(s), and separating the roles of CEO and Chairman.

Other studies investigated the relationship between organizational performance and CG using *financial measures*, such as Pham et al. (2011) analyzed the relationship between organizational performance and CG using economic value added (EVA) as an alternative performance measure. In contrast to other studies, they did not find a significant relationship between performance measures and CG. Bijalwan & Madan (2013) investigated the relationship between organizational performance and CG; they concentrated only on transparency and shareholders' rights, using accounting-based measures (i.e. financial ratios). They found a positive relation between CG practices and organizational performance. Salama & Putnam (2013) examined the impact of internal CG structures on the financial outcomes of global diversification; they found the higher quality CG, the better organizational performance.

Core et al. (2006) suggested that return on assets (ROA) is a better measure for examining the association between operating performance and CG. Bauwhede (2009) also focused on *operating performance*

using return on assets as the preferred measure of operating performance. They reported a positive relation between operating performance and CG.

Some studies examined how changes in CG impact the performance of *newly privatized firms* (e.g. D'Souza et al., 2006; Ho et al., 2011). Their results confirmed that changes in CG (especially changes in ownership) resulting from privatization might contribute to improve the organizational performance. As well, the enhancements in incentives of top management and employees could help explain the improvement in post-privatization organizational performance.

In a brief, most studies that investigated the relationship between organizational performance and CG found strong positive relationship between CG and organizational performance. Further, they found that strong CG requires appropriate performance measurement practices. Accordingly, the present study develops a PMS; using Institutional Theory, considering both the main performance dimensions of an organization and CG practices.

3. THEORETICAL DEVELOPMENT

3.1. CORPORATE GOVERNANCE & MECHANISMS OF CHANGE BASED ON INSTITUTIONAL THEORY

Many institutes set out recommended CG principles suitable for their environments. CG principles are the rules, regulations, and procedures that achieve the best protection of, and balance between the interests of, corporate managers, shareholders, and other stakeholders (CIPE, 2005). The principles of CG are evolutionary in nature and should be reviewed in light of significant changes in circumstances (OECD, 2004). For example, OECD (Organization for Economic Cooperation and Development) which comprises 29 governments around the world presented five principles of CG; these are the rights of shareholders, the equitable treatment of shareholders, the role of stakeholders, disclosure and transparency, and the responsibilities of the board (OECD, 1999; 2004). The OECD Principles consider as a declaration of minimum acceptable standards for companies and investors around the world (CalPERS, 2004).

Another example, in Philippine, ADB (2003)¹ put ten principles of CG; these are performance orientation, nomination and compensation committees, disclosure, audit committee, code of conduct, conflicts of interest, environmental and social commitment, conduct of the board of directors, responsibilities of investors, and the role of directors in turnaround situations.

In the UK, since the early 1990s, the problems concerning CG have been addressed in a series of government reviews, beginning with the Cadbury Report (1992), and then following the Greenbury Report (1995), the Hampel Report (1998), and finally the Combined Code (2003; 2006). The Combined Code is structured around five categories: directors, remuneration, relations with shareholders, accountability and audit, and institutional investors (Chang et al., 2006; Donnelly, 2008).

In California, CalPERS (2004) put many principles in depends on OECD principles; these are corporate objective, communications and reporting, voting rights, corporate boards, corporate remuneration policies, strategic focus, operating performance, and corporate citizenship.

Furthermore, in Egypt, CIPE (2005)² put the Egyptian Governance Corporate Code. The Egyptian code is structured around six categories: general assembly, board of directors, internal audit department, external financial auditor, disclosure of social policies, and avoiding conflict of interest.

CG became an essential requirement in companies. There are many different codes of "best practices", but there is no one model of CG that works in all countries and all companies. To keep the organizational performance aligns with CG principles; significant changes in PMSs must be done. This study manages the required changes in PMSs using *Institutional Theory*.

Institutional Theory is used to interpret the role of management accounting in organizational changes (Soin et al., 2002). If management accounting systems fail to become institutionalized routines they may become ignored or separated from operations (Hopper & Bui, 2015). Many researchers use Institutional Theory in management accounting, e.g. Seal (2006) analyzed how management accounting is implicated in CG using Institutional Theory. Sharma et al. (2010) theorized the changes surrounding the introduction of a management control innovation; total quality management techniques, within a case study, using Institutional Theory. Braunscheidel et al. (2011) studied the impact that the adoption and implementation of Six Sigma has on organizational performance using Institutional Theory.

The present study extends the scope of Institutional Theory by explaining how the change mechanisms impact to create and modify existing PMS. A new system is introduced in the contemporary organizational environment. Institutional Theory has four types of change mechanisms: displacement, layering, drift, and conversion (Alon & Dwyer, 2016). In this study a "displacement" is discussed. A displacement occurs when the

¹ ADB refers to Asian Development Bank.

² Center of International private Enterprise (CIPE) programs are supported through the United States Agency for international development.

old rules are completely replaced by the new rules. Therefore, it is the type reflected in the PMS that is proposed in this study.

From Institutional Theory viewpoint, three classifications of change mechanisms can be developed from CG principles; these are: *Fairness*, *transparency*, and *responsibility*, to help frame a PMS across a range of manufacturing companies. The three change mechanisms are herein after referred to “CG factors”.

Fairness is the first change mechanism in the proposed model that refers to the right of shareholders and equitable treatment of shareholders. Voußem et al. (2016) shed light on the relationship between fairness perceptions and target achievements, and investigate how ex ante incentive contract design characteristics and ex post bonus outcomes affect managers’ distributive and procedural fairness perceptions¹. Regarding ex post bonus outcomes, they found that the achievement of bonus targets positively affects perceptions of distributive, but not procedural fairness.

To achieve the fairness, rights to be protected include ownership rights other than voting, such as an equitable share of profits and dividends or equitable treatment for share repurchases. The quality of shareholders’ rights and the extent to which shareholders’ rights are protected must be considered when measuring the performance (Bushman et al., 2004; Cheung et al., 2011).

The present study extends research in this area by demonstrating how a PMS need to be established to prevent the use of inside information against some shareholders. And how shareholders should have the right to review and approve the compensation of the board of directors. Moreover, all shareholders should have the opportunity to obtain effective redress for violations of their rights.

Transparency as a second change mechanism in the proposed model refers to introduce good quality information, timely and accurate disclosure on all material matters regarding the organization; including the performance, financial situation, ownership, and governance of the company. The amount of disclosure is ultimately determined by the board of directors (Bushman et al., 2004; Cheung et al., 2011, Machuga & Teitel, 2009), therefore, the board of directors must be characterized by competence and independence. Kelton & Yang (2008) examined the association between CG mechanisms and disclosure transparency measured by the level of internet financial reporting behavior. The results indicate that CG mechanisms influence a firm’s internet disclosure behavior. Further, new regulatory guidance in CG leads to improve disclosure transparency via internet financial reporting.

Responsibility is the third change mechanism in the proposed model that refers to the role of stakeholders and board responsibilities. A firm cannot maximize value if it ignores the interest of its stakeholders. Responsibility reflects the interaction with and treatment of stakeholders such as shareholders, employees, creditors, customers, suppliers, and the environment. Therefore, CG framework; and thence the PMS, should recognize the rights of stakeholders, encourage active cooperation between firms and stakeholders, and include board activities, such as meeting frequency and director attendance; these activities can have a positive effect on organizational performance (Cheung et al., 2011; Ferris et al., 2003; Fich & Shivdasani, 2005; Jensen, 2010; Vafeas, 1999).

Under Institutional Theory, each change mechanism resulting from CG comprises new rules, these new rules result in new measures that are completely replaced the old rules and measures. In this respect, some research refers to transparency and accountability of activities as trends impact on performance measurement; for example, Melnyk et al. (2014) reported that 53% of respondents in their paper remark for transparency/accountability of activities and decisions as a high importance trend on the performance measurement in the organization today, and 17% remark significant importance. Moreover, the importance of transparency/accountability of activities for the organization five years in the future is high importance trend on performance measurement for 37% of respondents and significant importance for 57%. Their study proved the increasing importance of including the change mechanisms resulting from CG in the PMS.

In Institutional Theory, if management accounting is to play a role in improving CG, then the establishment and reproduction of appropriate institutionalized practices and routines is crucial (Burns & Scapens, 2000; Seal, 2006). Therefore, under Institutional Theory, a new perspective will be proposed in this study to build an integrated PMS considering CG factors as follows.

3.2. A NEW MODEL FOR ORGANIZATIONAL PERFORMANCE MEASUREMENT

To identify the dimensions of organizational performance, a three factor model; *Input-Process-Output* is posited. Such approach was chosen not only because it perfectly reflects the concept of integration between financial and non-financial measures, but also enables employing the perception of a cause-effect path, widely this approach complies with CG factors. Rupšys & Boguslauskas (2007) use *Input-Process-Output* approach in order to measure the quality of internal audit activity; they found in applying this approach commonly accepted

¹ Distributive fairness concerns judgments about achieved outcomes, whereas procedural fairness concerns judgments about the procedure used to determine these outcomes (Voußem et al. (2016).

solution to measure the quality of internal audit activity.

Under Institutional Theory and using a three factor model, this study attempts to develop a model of PMS begins with defining the strategic objectives inside each dimension of performance; *Input-Process-Output*, and thence identifying important metrics under every dimension with taking into account CG factors; *Fairness, transparency, and responsibility*, to determine the suitable measures of these metrics. Table 1 illustrates examples of strategic objectives inside each firm dimension; *Input-Process-Output*. Table 2 illustrates the related metrics of CG factors and *Input-Process-Output* dimensions.

Table 1
Strategic objectives inside each firm dimension (Input-Process-Output)

<i>Firm dimensions</i>	Input	Process	Output
<i>Strategic objectives</i>	<ul style="list-style-type: none"> ➤ Quality Will. ➤ Upgrade of technology. ➤ Focus on professional learning and development of employee skills. 	<ul style="list-style-type: none"> ➤ Appropriate utilization of financial resources. ➤ Increased materials and energy efficiency. ➤ Cost management ➤ Increased participation and involvement of employees. 	<ul style="list-style-type: none"> ➤ Increased income and net profits. ➤ Increased employee satisfaction. ➤ Increased customer satisfaction. ➤ Increased market share.

Table 2
The metrics of the proposed model (Input-Process-Output/ Fairness-Responsibility-Transparency)

<i>Firm dimensions</i>	Input	Process	Output
<i>CG factors</i>			
Fairness	(1) Competence of board of directors.	(1) Cash flow. (2) An encouragement and punishment system	(1) Fairness
Transparency	(2) Board of directors' independence.	(3) Firm's website (4) A variety of communication channels.	(2) Transparency
Responsibility	(3) Employee Competency. (4) Attract and retain employees with key competencies. (5) Quality will. (6) Technology.	(5) Innovation (6) Product & service quality (7) Cost (8) Time	(3) Quality performance

The *Input-Process-Output* PMS that takes into account CG factors is introduced in the following three sub-sections.

3.2.1. The Input Metrics

Firms should put their metrics and performance measures that align with their strategic objectives. In this study, the strategic objectives are divided into three categories according to firm dimensions; input, process, and output as shown in Table 1. Firstly, the *inputs' strategic objectives* may include the availability of Quality Will, upgrade of production technology and information technology, and focusing on professional learning and developing employee skills.

This study introduces a new concept into management accounting literature; Quality Will (QW). It is suggested what you have the will to do is what you can get. Therefore, QW can be defined as a generated desire of all organization staff that gives them the motivations to work hard for achieving the highest quality. It is an important variable to plan for successful future. QW explains to what extent the management has motivations and abilities to choose successful strategic tasks and strategies, and how to achieve them. If the management has the desire to achieve highest quality, they will choose the optimal strategy that suitable for the nature of firm activities, monitor the performance of competitors, keep up with modern technological developments, and follow-up the threatens of current strategy and unexpected events. QW also refers to the desire of top management to encourage employees to continuous research, creation an information network to collect appropriate information continuously, and exchange such information that help firm to discover external risks and opportunities. The firm staff; especially top management, must have QW to achieve fairness, make transparent, and take responsibility.

Further, technology can help firms to meet CG factors. Production technology plays an important role in sustainable development on the production level. It improves raw materials and energy productivity, and then it increases income and profit. Information technology also plays a major role in the development of accounting information systems by providing “the push that drives accounting activities” (Taipaleenmäki & Ikäheimo, 2013; Valmohammadi & Servati, 2011). Finally, focusing on professional learning and developing employee skills are significant factors to improve organizational performance because they make the outcomes better, and achieve CG principles. Professional learning and growing skills should comprise subordinates and top management; both need to develop their professional knowledge and skills, and both of them are important parties in achieving CG principles.

Based on *Inputs' strategic objectives*, the following metrics are developed; as shown in Table 2.

3.2.1.1. The Board of directors' competence

The board of directors plays a significant role in CG (Liang et al., 2013). Stakeholder Theory views the first and foremost task of boards to be the reconciliation of the interests of various stakeholder groups (Vinnari & Nasi, 2013). The responsibility of the board of directors is to choose a strategy, follow-up this strategy, evaluate the performance, improve the financial position and so on. These responsibilities require a competent board of directors that possess the knowledge, skills and other competencies needed to perform their responsibilities.

Agency Theory supports the appointment of financially competent board members who would protect stakeholder interests from managerial malpractice by monitoring finances, while Stewardship Theory advocates the recruitment of both financially and technically competent members who could make a positive contribution to organizational performance by providing advice. Finally, the Resource Dependence Theory in turn supports the appointment of technically competent board members to facilitate access to informational and other resources (Vinnari & Nasi, 2013). The board of directors who have talents to protect ownership rights, distribute an equitable share of profits and dividends, and prevent the use of internal information against some shareholders can help in achieving fairness. As well, the board of directors who give the opportunity to shareholders to review and approve their compensation helps in achieving fairness.

One objective of CG is to improve board of directors' oversight and to reveal more transparent information to shareholders (Machuga & Teitel, 2009). Although there are many tools to focus on the control of subordinates by senior executives, the problem of CG is an absence of similar controlling systems for senior managers (e.g. CEOs) and the board of directors. The connection between PMS and CG factors will make this control on overall performance easy to perform.

To explore board members' financial and technical competence and factors explaining the presence of such competence, some studies (e.g. Vinnari & Nasi, 2013) construct financial expertise estimates based on the board members' education and professional experience, while they estimate financial literacy levels based on prior board experience and participation in additional training in accounting and finance. Therefore, the PMS should measure the competencies of the board of directors.

In this study, board competence is estimated, as an input of firm quality performance when applying CG, based on the following: (1) *Educational level* of the board of directors, which indicated it by percentage of the board of directors who have high degrees. (2) *Professional experience* either as a member of the board of directors or in industry, which indicated it by the average number of years of experience. (3) *Professional certification*, which indicated it by percentage of certified board of directors; i.e., the percent of the board of directors who have the CIMA or PMP certifications to total board of directors. (4) *Effective special training*, which indicated it by average training hours per a member of board of director. (5) *Benchmark practices* of the board of directors. The company doesn't work alone. It works in an environment full of a lot of variables, i.e. competitors' actions, market share, and so on. Therefore, benchmark practices of the board of directors is measured by the level of best practices applied in the company compared with the level of best practices applied in the best competitor.

3.2.1.2. The independence of the Board of directors

Independence is most valuable in crucial board functions. A majority of independent directors are managers or decision makers who care about their reputation (Nguyen & Nielsen, 2010). Liang et al. (2013) found that the number of board meetings and the proportion of independent directors have significantly positive impacts on both performance and assets quality of a Chinese bank. Other many studies confirm that there is a strong relation between board independence and organizational performance (e.g. Choi et al., 2007; Dahya & McConnell, 2005; Donnelly, 2008; Leung et al., 2014; Zhaka, 2014). An independent board will monitor management, mitigate actions that destroy shareholder value, consider the interest of all shareholders, and reveal timely and accurate information. Therefore, the suggestion is assumed that the efficiency and the independence of the board of directors can play an important role in achieving transparency. Consequently, the PMS must consider the board independence.

To assess the independence of the board of directors, as an input of firm quality performance, based on the extant academic literature in measuring board independence and the factors of CG; the information about the

following two factors must be obtained or updated: (1) *The proportion of non-executive directors on the board*: The number of outside or non-executive directors is assumed to have a major influence on board independence. Therefore, the board should include a balance of executive and non-executive directors. Most of CG codes confirm that the board of directors should include a majority of non-executive members who have technical or analytical experience or skills which generate gains for the company (CIPE, 2005; Donnelly, 2008, The Combined Code, 2006). (2) *The presence of non-executive chairman*: The separation of the role of chairman and CEO is important and should be considered in measuring board independence. Donnelly (2008) found that the presence of a non-executive chairman is strongly related to the share price performance.

In the literature, there are other variables in measuring board independence, such as board size, but some earlier studies showed that there is no relation between organizational performance and board size (e.g. Cheung et al., 2011; Lehn et al., 2009), while Liang et al. (2013) found that board size has a significantly negative impact on Chinese bank performance. Therefore, the proposed model doesn't comprise this variable.

3.2.1.3. Employee Competencies

Employee competencies have been considered increasingly important in recent research. Employee competencies refer to a person's knowledge, skills and abilities, good team working, responsible leadership, good educational background, and a high degree of self-motivation (Cardy & Selvarajan, 2006; Pfeffer, 1994; Spencer & Spencer, 1993; Wright & McMahan, 1992; Wright et al., 1994; Yu, & Ramanathan, 2012).

Employee competencies, as other types of resources and capabilities, have the potential to be sources of competitive advantage, play significant roles in developing the operation strategies of low cost, quality and flexibility (Cardy & Selvarajan, 2006; Spencer & Spencer, 1993; Yu, & Ramanathan, 2012), and help to maximize value of stakeholders. So, the suggestion is assumed that the higher quality of employees the higher quality outcomes. Then, responsibility, as a factor of CG, will be achieved by competent employees. The PMS should have measures to evaluate the competency of employees who take the responsibility of achieving the firm activities. The degree of employee skills can be measured by education, certification levels and average personal experience.

In this study, the competence of the employees, as an input of firm quality performance, is assessed using the information on the following: (1) *Educational level of employees*, good educational background is measured by percentage of employees who have educational degrees suitable for their activities in the company. (2) *Professional experience*, it is measured by the average number of years of experience either in the company or the industry. (3) *Professional certification*, which indicated it by percentage of certified employees; i.e., the percent of employees who have the CIA, CIMA or CPA certifications of total staff. (4) *Continuing education*, which indicated it by average training per employee; i.e., the average training hours that completed during the year. (5) *The competence of using modern technologies*; technology impacts companies and their operations. Furthermore, technology impacts the ability to pool and analyze information more effectively than in the past, so this measure is indicated it by the level of modern technologies used.

3.2.1.4. Attract and retain employees with key competencies

The firm, to increase its quality performance, should bear the costs to improve and develop its employee's skills; so it must keep its employees. The firm must provide employees with the opportunity to renew their skills, talent pool and a long-term career plan. Furthermore, it must promote knowledge sharing, as well as the best practices. It must find ways to control or stop mobility to other firms. The firm must attract its employees by keeping turnover rates low (Slavich et al., 2013). In the proposed model, "turnover rate" is used as a measure of employees' mobility and firm attractiveness. So, the suggestion is assumed that the higher the firm attractiveness the higher employees perform their responsibilities.

3.2.1.5. Quality will

"Quality will" is a new concept which can be used to refer to the staff's desire to improve and develop the firm quality performance through performing their responsibilities. This concept belongs to top management more than other staff because the top management is responsible for monitoring the overall organizational performance. "Quality will" requires the promotion of a culture of efficiency and containment. It could be measured by a survey that contains the following information: (1) Degree of recognition of outstanding staff for their performance; measured by the number of proposed process improvements. (2) Reasons (or motives) that make senior management choose a particular strategy. (3) Strategic tasks that she/ he will prefer to do. (4) If she/ he satisfies with her/ his job (e.g. the extent of top management job satisfaction). (5) If her/ his job provides a long-term career. (6) If her/ his job provides a good salary.

3.2.1.6. Technology

Technology is a broad concept that comprises information, communication, production and other aspects in business. Technology is multifaceted, so the organization must invest in a comprehensive framework that supports the various types of knowledge, communication and processes. Technology can be used to catalogue expertise of organizational members (Al-Hawamdeh, 2002; Perez-Lopez & Alegre, 2012). Further, technology can play an important role in improving the organizational performance. It enables individuals to

enhance knowledge sharing and store information (Al-Hawamdeh, 2002), as a result decreasing error, increasing quality as well as increasing revenue. When the employees use modern technologies, they can perform their responsibilities easier. Therefore, upgrade information technology and production technology are very important input strategic objective which the PMS must reflect them. In the proposed model, measuring the advanced technologies, which the firm has, will be using a *number of new technologies* are used during a certain period.

3.2.2. The Process Metrics

The second category of metrics is process metrics. Process metrics and its related performance measures must achieve the *process' strategic objectives*. As shown in Table 1, the process' strategic objectives may comprise the appropriate utilization of financial resources, increased materials and energy efficiency, cost management, as well as increased participation and involvement of employees.

A firm has many constraints that must overcome them to continue its internal processing. One of the most important constraints is financial resources, so the firm must plan to use its financial resources carefully and keenly. Other constraints that the firm must overcome them are energy and materials. Energy efficiency is indirectly affected by several factors, most notably the capacity utilization rate, the volume of production, quality of materials and end products, and operator actions, hence the challenge is to consider all relevant factors and their interconnections with increasing energy efficiency. The firm should also improve material efficiency. Material efficiency in industrial production can be defined as the amount of a particular material needed to produce a particular product (Söderholm & Tilton, 2012; Virtanen et al., 2013).

Further, how to manage costs is too much forked matter, especially in these decades because the cost management has two important aspects; internal and external. External cost management refers to inter-organizational cost management; it consists of one or more activities that enable organizations to manage costs that extend beyond their boundaries. While some of the cost-management activities are traditionally applied to manage internal costs, e.g. activity-based costing, target costing, and value chain analysis, what brings them into the realm of inter-organizational cost management is the active involvement of two or more firms jointly using the combined resources associated with these activities for their mutual benefit (Coad & Cullen, 2006; Fayard et al., 2012). Therefore, firms must put a strategy to manage their costs; i.e. decrease, measure, control, and monitor the costs. Cost management doesn't work alone; it must be in the context of the key success factors in the organization, these are: quality, innovation, time, and cost.

Moreover, one of the most important strategic objectives is the increased participation and involvement of employees. Employees may be involved in and have influence on panoply of factors, including: the conceptualization of performance measures, defining the measures, identifying required data, adapting IT-systems, designing graphs and tables for the presentation of measures, and even producing the periodic performance reports. There are only a few studies in management accounting that have investigated such a broader notion of participation in the development and implementation of PMSs (e.g. De Haas & Algera, 2002; Groen et al., 2012; Hunton & Gibson, 1999; Kleingeld et al., 2004; Li & Tang, 2009; Wouters & Wilderom, 2008). These studies generally found beneficial effects; where the departmental performance improved when the jointly developed performance measures were put to use.

Based on *process' strategic objectives*, the following metrics are developed; as shown in Table 2:

3.2.2.1. Cash flow

A firm needs cash to continue its processes; it receives cash from customers and pays cash to suppliers and employees; the cash inflows and the cash outflows complement each other in enhancing the overall predictive ability of cash flow components (Farshadfar & Monem, 2013). Cash flow statement is an important managerial tool; it encourages firms to report cash flows from operating activities directly by showing major classes of operating cash receipts and payments. It is useful for predictive purposes (Bradbury, 2011); the big net positive cash flow the quality performance of a firm.

Cash flow statement illustrates the extent to which shareholders' rights are protected, warranties money for dividends, and gives the investors chance to choose between projects based on the higher net cash flow. Therefore, firms should plan to, and measure, their cash inflows and outflows, especially operating cash flow. Quick ratio or liquid ratio is also used to test the ability of a business to pay its short-term debts. It measures the ability of a firm to use its immediate cash or quick assets to extinguish its current liabilities immediately. In the proposed model *cash flow statement* and *quick ratio* are used as measures for firm cash flow.

3.2.2.2. An encouragement and punishment system

Encouragement and punishment systems represent a critical influence and driver of employee attitudes and behaviours. Compensation plays several key roles in organizations, including signalling employee worth, attracting potential job incumbents and retaining existing employees. Punishment is important to get responsibilities and rights clear, it has a significant role in maintaining fairness.

Encouragement and punishment systems are designed to increase employee productivity through greater accountability. It is important that employees understand the relationship between the performance levels

they achieve and the compensations they receive (Samnani & Singh, 2014; Sweins & Kalmi, 2008).

Equity Theory shows how an individual views fairness in regard to social relationships such as with an employee. According to Equity Theory, an employee identifies the achieved outcome (things gained such as performance ratings, bonus payments, or other rewards and benefits) from a relationship compared to the input (things given) to produce an input/output ratio. He then compares this ratio to the ratio of other employees in deciding whether he has an equitable relationship (Adams, 1965). Equity plays a role in the administration of punishment (Ball, et al., 1994).

Encouragement and punishment system can prevent staff from misleading some stakeholders or having potential conflicts of interest with shareholders. A suggestion assumes that the encouragement and punishment system achieves fairness. Therefore, using an effective encouragement and punishment system is measured by using a *survey* that comprises the following information: (1) To what extent does the relation exist between the performance levels and the compensations? (2) Does the current compensation system work well as an encouragement and punishment system? (3) To what extent do employees satisfy the compensation system? (4) To what extent does the top management satisfy the compensation system? (5) Are there any supposed changes in the current compensation system to be better?

3.2.2.3. Firm's website

Prior research indicates that both the content and presentation format of internet disclosures can improve disclosure transparency (Kelton & Yang, 2008). Firms must have the ability to use internet technologies to share information, process transactions, coordinate activities, and facilitate collaboration with suppliers, customers, shareholder, etc. Firm's website might be an effective way to deliver firm reports, summary reports and other relevant information available for company stakeholders (e.g. shareholders, customers, suppliers, employees, and investors). Currently, creation of a website is an inexpensive and excellent method for transparency and communication (Devaraj et al., 2007; Zheka, 2014).

The quality of a firm's website is measured by using a *survey* that includes the following information: (1) whether the firm has a website? (2) To what extent does the website have good presentation format and clear content? And to what extent do users become satisfied with this website? (3) To what extent is the website updated and upgraded? And what is the duration between updates?

3.2.2.4. A variety of communication channels

Transparency requires a direct communication between firms and the stakeholders, either the outsiders (e.g. shareholders, investors, customers, and suppliers) or the insiders (e.g. management and employees). Channels for disseminating information should provide for equal, timely and cost-efficient access to relevant information by users (OECD, 2004). Therefore, firms need using a variety of communication channels that will be measured in the proposed model by *number of communication channels*.

3.2.2.5. Innovation

There are four key success factors that make a firm in the first class of industry, achieve customer satisfaction, and achieve stakeholders' interests; one of them is innovation. A constant flow of innovative products or services is the basis for ongoing firm success. The competition required the companies are concentrating on improving different aspects of their operations. At times, a company may have to make more fundamental changes in its operations and restructure its process to achieve improvements in cost, quality, timeliness or service (Drury, 2008). If a firm wants to do its responsibilities toward its stakeholders, it must be interested in innovation. Some examples to measure innovation include: (1) *Number of new innovative products and services during the period*. (2) *Number of non-routine issues* discussed in the meetings of the board of directors.

3.2.2.6. Product & Service Quality

Because customers expect high levels of quality, the second key success factor that makes a firm in the first class of industry is quality. Total Quality Management (TQM) is a philosophy in which management improves operations throughout the value chain to deliver products and services that exceed customer expectations. TQM encompasses designing the product or service to meet the needs and wants of customers, as well as making products with zero (or minimal) defects and waste (Drury, 2008). Some research supposes a relation between quality and innovation, e.g. Sadikoglu & Zehir, 2010. Their results support that innovation performance partially mediates the relationship between TQM practices and organizational performance.

CG framework should recognize the rights of stakeholders (e.g. the responsibility toward the customers' needs). Therefore, PMS should evaluate cost and revenue as well as assess benefits of TQM initiatives.

In this study, the quality is measured by using the following measures: (1) *Quality of raw materials*; that will be indicated by defect rate and scrap rate, (2) *Quality costs* that comprises prevention costs, appraisal costs, internal failure costs, and external failure costs, and (3) *Efficiency of energy consumption*. Energy efficiency measurement and management are usually based on the use of indicator "*specific energy efficiency*"; SEC. Its use is widespread in the manufacturing industry although varying terminology exists. SEC is the ratio

between the total energy used and the useful output of the process measured in physical units¹ (Virtanen et al., 2013).

3.2.2.7. Cost

The third key success factor that makes a firm in the first class of industry is cost. The consensus is increased that perfect quality can be achieved at a minimum cost because of the rapidly developing technologies in automation, robotics, etc. Moreover, inspection and testing costs have decreased significantly due to automation in these areas as well (Srivastava, 2008). Firms face continuous pressure to reduce the cost of their products and services they sell. Understanding the tasks or activities (such as setting up machines or distributing products) that cause costs is useful for calculating and managing the production costs. In order to set cost-reduction targets, there are some effective approaches, for example target costing approach; it can be used to align customer needs (e.g. price and functionality) and shareholder interests (e.g. profit) in practice. Managers strive to achieve the target cost by eliminating some activities (such as rework) and by reducing the costs of performing activities (Drury, 2008, Maiga et al., 2013; Woods et al., 2012). A firm that seeks to reduce costs does its responsibility towards the stakeholders. In the proposed model, cost improvement can be measured by using the *percentage of cost reduction*.

3.2.2.8. Time

The fourth key success factor that considered a process metric in the proposed PMS is time. Firms are seeking to increase customer satisfaction by providing a speedier response to customer requests, ensuring 100 percent on-time delivery and reducing the time taken to develop and bring new products to market (Drury, 2008). A firm can maximize its value if it respects the time. Therefore, one of the firm responsibilities is to respect the time, either for response to customer needs or to deliver the sold units.

The proposed model comprises the following measures for time: (1) *Cycle time*, firms should reduce cycle time focusing on getting rid of non-value-added activities, and (2) *Total available hours* per month either machine hours or labour hours. The available time comparing with the needed time indicates to the extent of commitment time.

3.2.3. The Output Metrics

The third category of strategic objectives as shown in Table 1 is related to outputs. The *strategic objectives of outputs* which will be achieved may include increasing income and net profits, increasing employee satisfaction, achieving customer satisfaction, and increasing market share.

Firms must achieve profits to continue in the market, attract investors, satisfy their shareholders, as well as attract and retain clever employees. Therefore, increasing income and net profits is one of the most important strategic objectives. Moreover, customer is the source of revenues, so the number of organizations aiming to be “customer- driven” is large and increasing. Customer Focus is a guiding principle the way firms do business. It is an attitude about everything firms do that prompts them to ask themselves constantly: “How can we add value for the customer?” Their commitment to customer focus has been reinforced by the measurable impact it has had on employee morale and the bottom line. Customer satisfaction leads to increase customer acquisition, customer profitability and customer retention (Cooper et al., 2013; Drury, 2008). Customer satisfaction also leads to increase market share; especially in the competitive markets where cause and effect relations are existing between market share and customer satisfaction. Firms concern with their market shares can satisfy their stockholders.

Based on *outputs’ strategic objectives*, the following metrics are developed; as shown in Table 2:

3.2.3.1. Fairness

Fairness is one of CG factors that take into account the shareholders’ rights and the extent to which shareholders’ rights are protected. Firms must do their best to achieve this target, and their PMS must evaluate *Fairness*. In the proposed model, fairness is measured by using the following measures: (1) Ratio of book value of debt/ to market value of equity. This ratio illustrates the extent that a board protects the rights of shareholders include ownership rights, (2) Dividends per share (DPS) comparing with other firms in the industry. Whenever firms protect ownership rights, they must achieve an equitable share of profits and dividends or fair treatment for share repurchases. Some studies suggest focusing attention on using cash flow per share as the better predictor of dividends (e.g. Consler et al., 2011). (3) Staff satisfaction survey. Employee is an aspect of the firm's stakeholders, so he/she must feel satisfaction by his/her job, task, salary, career and environment. Employee satisfaction has a significant impact on organizational performance, it increases the firm ability to gain competitive advantages, improve product and service quality, and decrease costs. Firms could improve employee

¹ SEC formula can be written as follows:

$$SEC = \frac{\text{energy used}}{\text{products produced}}$$

satisfaction using training and internal communication (Huanga & Rundle-Thiele, 2014). In this study, employee satisfaction comprises not subordinates only but top management as well. Employee satisfaction can be a predictor of fairness. In the proposed model, staff satisfaction is measured by a satisfaction survey.

3.2.3.2. The Credibility of Financial Reporting

Earlier studies report that there is a positive relationship between the quality of CG and the credibility of financial reporting (Cohen et al., 2002, 2004; Farbar, 2005; Lin & Liu, 2009). Some studies report that one of the most important functions that CG can play is ensuring quality of financial reporting process. For example, Al-Ajmi (2009); Beasley (1996); Beasley et al. (1999); Beasley et al. (2000); Carcello and Neal (2000); Dechow et al. (1996) and Klein (2002) report an association between weaknesses in governance and poor financial reporting quality, earnings manipulation, financial statement fraud, and weaker internal controls.

In the proposed model, *the credibility of financial reporting* is used as a measure of transparency. According to CG principles (OECD, 2004, 4th principle), CG framework should ensure that timely and accurate disclosure. To achieve these principles disclosure should include, but not be limited to, material information on: (1) The financial and operating results of the company, (2) Company objectives, (3) Major share ownership and voting rights, (4) Remuneration policy for members of the board and key executives, and information about board members, including their qualifications, the selection process, other company directorships and whether they are regarded as an independent by the board, (5) Related-party transactions, (6) Foreseeable risk factors, (7) Issues regarding employees and other stakeholders, and (8) Governance structures and policies.

On the other hand, to achieve transparency information should be prepared and disclosed in accordance with high-quality standards of accounting. The disclosure should have financial and non-financial information. Therefore, the credibility of financial reporting is considered one of the output metrics in PMS, which will be measured by yes/no answer.

3.2.3.3. Quality Performance

Firms should perform high-quality performance to survive in heightened competition (Kitapçı & Çelik, 2014). When the board of directors bears its responsibilities, and the stockholders play their role in firms; the result could be quality performance. The majority of studies addressing the association between governance and financial performance have relied on accounting-based indicators (e.g. Return on Assets, Return on Equity, and Return on Sales) or market-based indicators (e.g. market to book value) as measures for performance (Sanchez-Ballesta & García-Meca, 2007). However, the accounting measures are concerned more about the profitability of the firm. In contrast, market to book value represents the future expectation of the firm's actual value. Therefore, market to book value could be employed in addition to the following financial and non-financial measures in order to capture the outputs of responsibility. These measures could be: (1) Ratio of operating profit to income, (2) Rate of sales growth, (3) Ratio of cost of goods sold to sales value, (4) Percentage of total annual CEO compensation that is compared by performance plans, (5) Customer satisfaction; firms must measure and take into their accounts how to satisfy the current and potential customers. Customer satisfaction can be measured by a *survey*. The customer satisfaction survey must comprise number of products or warranty claims, number of product litigation, and number of customer complaints (Maiga et al., 2013), (6) Return on total assets, and (7) Percentage of market share.

Table 3 summarizes the performance measures in the proposed model that include input-process-output measures and take into account CG factors (fairness, transparency, and responsibility).

Table 3
 The summarize of performance measures

Performance dimensions	Metrics	Measures
Inputs	Board of directors' competence	<i>M₁) Educational level</i>
		<i>M₂) Professional experience</i>
		<i>M₃) Professional certification</i>
		<i>M₄) Effective special training</i>
		<i>M₅) Level of best practices applied.</i>
	The independence of Board of directors	<i>M₆) The proportion of non-executive directors</i>
		<i>M₇) The presence of non-executive chairman</i>
	Competency of employee	<i>M₈) Educational level</i>
		<i>M₉) Professional experience</i>
		<i>M₁₀) Professional certification</i>
		<i>M₁₁) Continuing education</i>
		<i>M₁₂) Modern technologies used</i>
	Attract and retain employee	<i>M₁₃) Turnover rate</i>
		<i>M₁₄) Quality Will Survey</i>
		<i>M₁₅) number of new technologies</i>
Process	Cash flow	<i>M₁₆) Cash flow statement</i>
		<i>M₁₇) Quick ratio</i>
	Encouragement and punishment system	<i>M₁₈) Survey</i>
	Firm's website	<i>M₁₉) Survey</i>
	Variety of communication channels	<i>M₂₀) No. of communication channels</i>
	Innovation	<i>M₂₁) Number of new innovative products or services during the period</i>
		<i>M₂₂) Number of non-routine issues discussed in the meetings of the Board of Directors</i>
	Product Quality	<i>M₂₃) Quality of raw materials</i>
		<i>M₂₄) Quality costs</i>
		<i>M₂₅) Efficiency of energy consumption (SEC)</i>
	Cost Time	<i>M₂₆) Percentage of cost reduction</i>
		<i>M₂₇) Cycle time</i>
		<i>M₂₈) Total available hours per month</i>
Outputs	Fairness	<i>M₂₉) Ratio of book value of debt/ to the market value of equity</i>
		<i>M₃₀) Dividends per share (DPS)</i>
		<i>M₃₁) Staff satisfaction survey</i>
	The credibility of financial reporting	<i>M₃₂) Report should disclose the financial and operating results, company objectives, major share ownership and voting rights, information about board members & remuneration policy, foreseeable risk factors, and governance structures and policies</i>
		<i>M₃₃) Report should be prepared and disclosed in accordance with high quality standards (y/n)</i>
		<i>M₃₄) Ratio of operating profit to income</i>
	Quality performance	<i>M₃₅) Rate of sales growth</i>
		<i>M₃₆) Ratio of Cost of goods sold to sales value</i>
		<i>M₃₇) Percentage of total annual CEO compensation that is compared by performance plans</i>
		<i>M₃₈) Customer satisfaction</i>
		<i>M₃₉) Return on total assets</i>
		<i>M₄₀) Percentage of market share</i>

In sum, the proposed model comprises financial and non-financial, short run and long run, physical and moral measures. This model considers cause and effect relationships because it deals with the inputs that convert to output passing the processing. As well, it considers the new variable in the business environment; CG. CG becomes a robust requirement to give trust the firm; so firms must use a PMS to help achieving strong CG practices.

The proposed model is divided into nine parts; it is in a matrix form (3 × 3); it is concerned about the three main aspects in organizational performance (*Input-Process-Output*) and the three factors of CG (*Fairness, Transparency, and Responsibility*), with attention to strategic objectives. The proposed model has 15 measures of inputs, 13 measures of processes and 12 measures of outputs; totally 40 measures. We suppose these measures are critical elements to appropriately focus the firm on what important in business.

4. RESEARCH METHOD

The present study examines the importance of the proposed model to measure the organizational performance, and apply this model in a case study. To investigate this issue, three methods are considered in this study. The first method involves a survey questionnaire. Invitations have been sent to Egyptian companies and people with e-mails that inviting them to complete and return the questionnaire. The second method involves the interviews with some respondents to have more responded and more detailed analysis. Two hundred invitations and questionnaires are sent and distributed, and returned 128, with a 64% response rate. The third method is a case study conducted in an Egyptian manufacturing company to apply the proposed model.

The questionnaire is divided into four sections. Section (1) requires respondents to give information on positions they occupy, the type of their institutions, and the number of employees in their companies. Section (2) requires participants to state their attitude about the relationships between PMS and CG factors. Section (3) asks respondents to mark in front of every measure of PMS to state their perceptions on the importance of every measure. Finally, Section (4) requires participants to state their comments and notes if they have. Using a 5-point Likert scale, respondents were asked to scale items in the questionnaire.

The Statistical Package for Social Sciences (SPSS v. 16) is used for data analysis. In the descriptive analysis, frequency, and mean were calculated. In inferential methods, Factor Analysis, Pearson correlation, T-test, and ANOVA one-way are used.

4.1. Sample & Data

This study uses non-probability sampling, purposive sampling, for questionnaire testing. Therefore, the sample is based on who we think would be appropriate for the study; Egyptian manufacturing companies working in the private sector. Using descriptive analysis, the result shows that the majority of respondents have experience more than 15 years, about 76.6%. This long time of experience makes their opinions more rational. As well, the size of the respondents' companies in the sample ranges between small and big, with less than 100 employees to 5,000 employees. The sample contains a variety of institutions; all of them are Egyptian manufacturing companies in the private sector.

4.2. Creditability

In total 40 performance measures were listed in the survey. Respondents were asked to evaluate the significant of the proposed performance measures in respect of CG factors and firm quality performance. To measure and acknowledge the degree of measurement error through the assessment of reliability, a Cronbach's alpha (α) can be used (Valmohammadi & Servati, 2011); a value of 0.70 or greater is said to provide confidence in the internal consistency of the scale.

The results show that Cronbach alpha coefficients are 90.2% for the fifteen items of input, 88.7% for the thirteen items of process and 91.3% for the twelve items of output, which indicate that the items have a high-level of internal consistency for the scale.

To test for non-response bias, an approach suggested by Oppenheim (2001) is adopted. The sample is divided into two groups; "early" and "late" respondents¹, the results reveal that there are not any statistically significant differences in the mean scores between the early and late responses (all $p > 0.05$).

4.3. The measurement of variables

The proposed PMS which comprises Input-Process-Output approach and considers CG factors; fairness, transparency, and responsibility, was measured by a 15 measures of input, 13 measures of process, and 12 measures of output. Respondents were asked to indicate the measures on a five-point Likert-type scale; where five indicates a "very high important" measure, four an "important" measure, three "equal", two a "slightly important" measure, and one a "very low important" measure.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy; is 0.594 for input, 0.682 for process, and 0.737 for output. As Kaiser (1974) recommended, the value of KMO is greater than 0.5 and ($p < 0.05$) lead us to conclude that the correlation matrix is acceptable for factor analysis (Chong & Rundus, 2004). Therefore, the results provide a reasonable basis for using factor analysis in this study.

A factor analysis is conducted on all the forty measures. Factor analysis is used to explore the important measures which affect the performance of the company. And then it is used to eliminate measures that do not belong and to keep measures that have high 'loadings' on the factor that could be measured (Oppenheim, 2001).

¹ The standard way to test for non-response bias is to compare the early responses to the late responses. However, the literature hasn't a clear definition of a late respondent. But, consisting with the recommendations of Lindner et al., (2001) and Borg & Gall (1983) who suggest a minimum of 30 respondents for late respondents, or using the later 50% of respondents as the late respondent group, our sample is divided into two groups; "93 early respondents" and "35 late respondents".

If coefficients of these variables (measures) show a positive correlation, this implies that more inputs generate more outputs and the coefficients are significant (Hung et al., 2014; Kristensen & Israelsen, 2014).

The results of the factor analysis show that all the correlation coefficients are positive, except for one relation related to M_7 , one relation related to M_{18} , and two relations related to M_{20} that would exclude from the model. Otherwise, the coefficients are significant. Therefore, these measures hold relationships that are justifiably included in the model.

Moreover, the results of the principal components factor analysis of the forty measures indicates that the factor loadings (Communalities) are all high, which are substantially above the minimum requirements of 0.40 (Devaraj et al., 2007), except for M_4 and M_7 are excluded from the input measures, and M_{18} , M_{20} are excluded from process measures because their factor loadings are near 0.4.

Furthermore, the factor analysis reveals a single factor with an eigenvalue greater than five (Lamminmaki, 2008); it's 6.814 for input with a percentage of variation explained of 77.973%, 6.341 for process with a percentage of variation explained of 75.841% and 6.555 for output measures with a percentage of variation explained of 73.288%. All of these results show that the extracted components represent the variables well. These results give the possibility for progress in evaluating the proposed model which now consists of 36 measures.

Furthermore, T-test is used to analyze the relationship between PMS and CG factors. In order to test this correlation, three statements are included in the questionnaire about the relationships between PMS and fairness, transparency, and responsibility. The respondents were asked to state their attitude choosing from 5-likert scale. A score is given from five strongly agree to one strongly disagree.

An expected result is obtained which indicates a strong relationship between PMS and CG factors at the 0.05 level ($p < 0.05$), that ensure the author claim there are strong positive relationships between PMS and CG factors (fairness, transparency, and responsibility). The respondents recognition of this relationship makes the author task; in connection between PMS and CG factors, is easier than expected.

Using T-test also a ranking of the 36 measures is performed. The results indicate the most important measure in Input is M_9 "employee' professional experience" ($t\text{-value} = 48.558$). The most important measure in Process is M_{23} "quality of raw materials" ($t\text{-value} = 44.884$). Further, the most important measure in Output is M_{38} "customer satisfaction" ($t\text{-value} = 45.545$).

Additional analysis is performed to test whether there are significant differences in the importance of measures according to whether company can apply or not apply CG; the analysis of variance (ANOVA one-way) is used. ANOVA treats with interval data, so the intervals between categories of Likert scales are assumed to be equal in order to treat the data as interval, not as ordinal. ANOVA uses variance to cast inference on group means, so input, process, and output are averaged to yield the means and then compared between means using SPSS.

The results show that, p-values of input and output are 0.271 and 0.074 respectively is more than ($\alpha = 0.05$), that implies there are significant differences in the importance of input and output measures according to whether company can apply or not apply CG. But, p-value of Process (.000) is less than ($\alpha = 0.05$), that implies there are no significant differences in the importance of process measures according to the applying of CG. This is an important result because both companies whether apply and not apply a code of CG are interested in performance measures in the proposed model during the manufacturing processes.

4.4. Case Study

This section provides the background to the case company and shows the results of implicating the new model.

The case study is an Egyptian joint stock company that produces fertilizers. It started the activity in 1979. The company is listed in the Egyptian Securities Exchange; therefore, it should apply CG practices. The company works on diversity of products; nine products produced through six production lines. It has ISO 9001, 14001, 18001, 17025.

In order to evaluate the performance of this company using the proposed model, the available data from the company and from the Egyptian Stock Exchange website are collected, they are as follows:

- Basic information about the company which includes company's name, profile, legal shape, address, number of stocks, capital, and external auditor,
- Company's vision, mission, and objectives,
- Details of company's capital structure,
- Information about the board of directors, e.g. the executive and non-executive members, their contributions in the capital of company, and the name of their companies or banks that they represent, and information about the executive managers,
- Details of its products,
- The annual financial report which includes the financial statements and required disclosures,

- The decisions of the board of directors,
- The decisions of the ordinary general assembly,
- The audit committee' report that includes the evaluations of production plans, growth rate of revenue and net income. It also includes financial and non-financial indicators. Further, the audit committee' report illustrates whether the financial statements are prepared according to the Egyptian accounting standards and the related Egyptian laws. Finally, the report sheds light on the sources of finance for the company, as well difficulties and obstacles faced by the company. The audit committee gives some recommendations to overcome these difficulties,
- Training plans, the company has training center providing a diversity of courses, and
- The company has a website that shows a medical guide for employees. It includes names of hospitals, clinics, pharmacies, radiology, and analysis centers.

Moreover, an interview with two managers in the company is conducted. Table 4 summarize the results during 2013 and 2014.

Table 4
 Assessing the case study performance using the proposed model

Inputs:	2013	2014
(1) Educational level of the board of directors	10 of board of directors have university degrees and one is a worker	10 of them have university degrees and one is a worker
(2) Professional experience either as a member of the board of directors or in industry	More than 15 years	More than 15 years
(3) Professional certification, which indicated it by percentage of certified board of directors	Zero%	Zero%
(5) Benchmark practices of the board of directors	One production line was closed for one week to renew it.	A memorandum of understanding between other two companies to build a new factory during the next four years
(6) The proportion of non-executive directors on the board	90.9% (1 executive & 10 non-executive)	90.9% (1 executive & 10 non-executive)
(8) Educational level of employees	No. of employees is 3,271; they have diversity of certificates range between master degrees and no certificate.	No. of employees is 2,950; they have diversity of certificates range between master degrees and no certificate.
(9) Professional experience	Range between five to more than 20 years	Range between five to more than 20 years
(10) Professional certification	Zero%	Zero%
(11) Continuing education	46 courses are available at the company's training center.	46 courses are available at the company's training center.
(12) The competence of using modern technologies	Not available	Not available
(13) turnover rate	0.4%	9.8% The reasons of high turnover rate are that: - Two production lines have been closed due to a lack of gas supply. - Other companies attract the skilled workers to work in them
(14) survey of quality will	Not available	- The formation of the board of directors is changed every three years. - The board of directors get high remunerations for attending meetings - There are no clear strategic tasks in the performance of the current board of directors comparing with the board of directors in last periods. For example, in 2009 eight new electronic systems and developments had been entered into the production lines
(15) number of new technologies	A new electronic system was entered into the production lines at an investment cost of up to 65 million pounds	There is no new technology. Moreover, two production lines have been closed due to a lack of gas supply.
Process:	2013	2014
(16) cash flow statement	✓ cash flow statement is available at the website	✓ cash flow statement is available at the website
(17) quick ratio	1.82	1.6098
(19) firm's website	The company has a simple website that introduces useful information for one period.	The company has a simple website. The website is updated continuously, but it doesn't allow the customers to execute transactions through it.
(21) Number of new innovative products	No new products, but many renovations in the production lines are conducted.	No new products or renovations.

(22) Number of non-routine issues	4 issues were discussed: <ul style="list-style-type: none"> - Renew & replacement equipment - Increasing the capacity - New investments in other companies - Proposals for investment in the long-term 	There is no non-routine issues was discussed
(23) Quality of raw materials	Not available	The auditing committee report illustrates that the lost units' ratio is increased because of the low gas pressure.
(24) Quality costs	Not available	73.19% prevention costs 12.83% appraisal costs 13.98% failure cost; the company spent failure costs to overcome the negative effects of its production on the environment
(25) Efficiency of energy consumption: <ul style="list-style-type: none"> • SEC- Gas • SEC- electricity 	SEC-Gas =55 m ³ /ton SEC-electricity =0.0054 k. watt/ton	SEC-Gas = 57 m ³ /ton SEC-electricity = 0.0055 k. watt/ton
(26) percentage of cost reduction	The production costs increased by 20.71%	The production costs increased by 26.56% Reasons of increasing costs: <ul style="list-style-type: none"> - The price of natural gas increased. - The price of the currency change increased. - The cost of export to other countries increased.
(27) Cycle time	Not available	Not available
(28) Total available hours	Not available	Not available
Output:	2013	2014
(29) Ratio of book value of debt/ to market value of equity	0.812%	0.814%
(30) Dividends per share (DPS)	EGP 13.17	EGP 13
(31) staff satisfaction survey	"Many Demonstrations happened during this year to improve the status of employees", the manager said.	"Some sovereign decisions have been taken to improve employee incomes, but they are not sufficient from the employees viewpoint", the manager said.
(32) Disclosure on the following: (a)The financial and operating results of the company, (b) Company objectives, (c) Major share ownership and voting rights, (d) Remuneration policy for members of the board and key executives, and information about board members, including their qualifications, the selection process, other company directorships and whether they are regarded as an independent by the board, (e) Related-party transactions, (f) Foreseeable risk factors, (g)Issues regarding employees and other stakeholders, and (h)Governance structures and policies	(a) ✓ (b) ✓ (c) ✓ (d) ✓(partially) (e) ✓ (f) ✓ (g) ✓(partially) (h) ✓	(a) ✓ (b) ✓ (c) ✓ (d) ✓(partially) (e) ✓ (f) ✓ (g) ✓(partially) (h) ✓
(33) The business reports should be prepared and disclosed in accordance with Egyptian accounting standards and the related Egyptian laws. Moreover, the disclosure should have financial and non-financial information.	Yes	Yes, the auditing committee report illustrates that the business report is prepared according to Egyptian accounting standards and related laws. Moreover, the disclosed information is financial and non-financial.
(34) Ratio of operating profit to income	36.69%	30.62%
(35) Rate of sales value growth	19%	17%
(36) Ratio of Cost of goods sold to sales value	45.73%	50.14%
(37) Percentage of total annual CEO compensation that is compared by performance plans	Not available	Not available
(38) Customer satisfaction measured by a survey.	"The company has been working since 1979. Our products are sold in Egypt as well as in many other countries, That implies our customers satisfaction", the manager said.	Although the market share is 6.06%, the company becomes a leader in producing nitrogen fertilizers in Egypt; its market share of this product is around 70% of Egyptian market.

(39) Return on Total Assets	0.231	0.174
(40) Percentage of market share	Not available	6.06% of Egyptian market [Source: HCF]

5. DISCUSSION

This study addresses an important issue about the PMS in the companies that apply CG. A model of forty measures is created. A factor analysis of forty measures is performed to eliminate unnecessary measures. The result indicates high relative importance for the measures in the proposed model, except for M₄, M₇, M₁₈, and M₂₀ that are excluded from the model.

Based on the results, there is a strong positive relationship between PMS and CG factors. The results of descriptive statistics show that no one of the respondents refuses existing relationship between PMS and CG factors, 9.4% neither agree nor disagree, 39 % agree, and 51.6% strongly agree. Additional analysis for the ratio of respondents who neither agree nor disagree (9.4%) using Crosstabs; the results indicate that all of them belong to firms don't apply CG. This information makes the current finding logic. These results are in the context with earlier studies, e.g. Bijalwan & Madan (2013) who found a positive relation between CG practices (using transparency and shareholders' rights) and organizational performance (measured by financial ratios), and Bauwhede (2009) who focused on operating performance. He reported a positive relation between operating performance (measured by return on assets) and CG.

Further, the results of this study indicates high importance of all individual measures in the proposed model of Input-Process-Output performance measurement. The results show that the highest importance measures are, respectively: M₉ (employee' professional experience); a measure of employee' competency, which indicates the importance of experience in performing the activities in Egypt, M₂₃ (quality of raw materials); a measure of product quality, which indicates the importance of raw materials quality as a valuable part in manufacturing processes, and M₃₈ (customer satisfaction); a measure of quality performance, which indicates that Egyptian companies, like others in the world, put the customer in the first class and do the best to satisfy him/her.

The results also show significant differences in the importance of input and output measures according to the applying of CG, but both companies whether apply and not apply a code of CG are interested in performance measures during the manufacturing processes.

Finally, the case study resulted in many findings which can be classified into results related to input, process, and output measures. The results of input measures show that there were no significant changes in the organizational performance between 2013 and 2014. But, the turnover rate became in 2014 higher than in 2013. The reasons of high turnover rate lied in closing two production lines due to a lack of gas supply. Furthermore, other companies attracted the skilled workers to work for them.

The process measures have conflicted results. The company faced decline in quick ratio. It hadn't new products. There was no new development during 2014, maybe because of the changes in board of directors' structure. Moreover, the ratio of lost units increased because of the low gas pressure. The Efficiency of energy consumption decreased slightly because the troubles in gas pressure and the increasing in lost. The company had an increasing in cost by 5.85% from 2013 to 2014. Reasons of increasing costs were the price of natural gas increased, the price of the currency change increased, and the cost of export to other countries increased. However, the company improved its website. It was keen on producing high quality products, so it spent quality cost at 73.19% to prevent pad quality.

Furthermore, the result of output measure shows relatively poor performance in 2014 comparing with 2013. There was increasing in the ratio of book value of debt to market value of equity by 0.002%. Although the customers seemed to be satisfied and the disclosures were sufficient, the other results of output were not good. These pad results appear in decreasing dividends per share, lack staff satisfaction, decreasing ratio of operating profit to income, ratio of cost of goods sold to sales value, and return on total assets. Moreover, the operating income also decreased by 18.28% and the net income decreased by 30% from 2013 to 2014.

Only ten companies capture the Egyptian fertilizers market, the case study has 6.06% of Egyptian market share. This ratio is relatively small comparing with other companies in the same industry.

In general, all data of 2014 is available except for four measures, they are: the competence of using modern technologies, cycle time, total available hours and percentage of total annual CEO compensation that is compared by performance plans. A manager justifies this saying *"our company is interested in modern technology. Our main objective is to enter new technologies and electronic systems, but we don't measure this metric explicitly. We don't also measure cycle time and total available hours. On the other hand, the company has two CEOs, but their compensations are not calculating separately"*.

According to factor analysis M₄, M₇, M₁₈, and M₂₀ are excluded from the model. In the case study, M₄ (Effective special training for board of directors) has little importance comparing with the continues training for employees; One course is available for department heads, senior supervisors, managers and others who need to develop their managerial skills, and 46 courses are available for employees.

M₇ (*The presence of non-executive chairman*) is excluded from the model. It's a measure of independence of the board of directors; 28% of respondent finds this measure less important, 34.4% finds it "neither important nor not-important", only 9.7% finds it very important, and the others find it important. Moreover, the chairman in the case study is executive. This result can be explained by the culture of the Egyptian, because they have believed that the chairman must be a senior member of the company and has a great experience in the field of industry, not only has a great experience in business administration. This result is consistent with the findings of Zheka (2014). He found a negative effect of separating the responsibilities between CEO and Board Chairman on performance. He explained this negative effect by the inability of non-employee chairman to get access to timely and accurate business information of a company and/or the lack communication between chairman and the company's management and inability non-employee chairman to exercise his/her power appropriately. Further, M₁₈ (*a survey to assess the encouragement and punishment system*), and M₂₀ (*number of communication channels*) are excluded from the model and the related data is not available in the case study.

Although M₆ is included in the model, it has an absolutely less importance. M₆ is the proportion of non-executive directors on the board of directors; it is a measure of independence of the board of directors. It is an important rule in most of CG codes around the world, even in Egypt. The Egyptian code of CG, rule no. (3-4) says that "*board of directors should include a majority of non-executive members who should have technical or analytical experience or skills which may generate gains to the company*". This result can be attributed to laws that organize business in Egypt, such as Law No. 159 of 1981 and Law No. 95 of 1992. These laws don't care about the composition of the board of directors. Maybe that is the reason behind the respondent answers about the unimportant of this measure, especially there is not much difference in the opinion of respondents who belong to companies apply CG or not. The result in this respect doesn't differ from some earlier studies. In spite of study of Donnelly (2008) who put a model incorporates a summary measure of board independence; his model confirmed the relation between the independence of a company's board and its returns, other studies showed that there was no relation between board composition and firm value (i.e. Hermalin & Weisbach, 1991; and Bhagat & Black, 2002).

6. SUMMARY AND CONCLUSIONS

Strong CG requires that appropriate performance measurement practices must be embedded in organizations. CG becomes a robust requirement to give trust the firm, so firms must use PMS helps them achieve strong CG.

Therefore, this study attempts to build a new PMS considering CG practices using Institutional Theory. Although there is no research in the management accounting literature to date, to the best of the author knowledge, appears to address this issue, some research in the literature measures the effect of CG on organizational performance using different measures; for example market value, under-pricing, and financial measures (e.g. EVA or return on assets).

This study discusses CG codes in some countries. Three main dimensions of organizational performance (input-process-output) and three change mechanisms of CG (fairness, transparency, and responsibility) are concluded. Therefore, this study suggests that the performance measures that take into account CG factors can assess the progress of organizational performance and improve its quality.

A new PMS is developed starting with defining strategic objectives inside every dimension of performance. Then, the important metrics under every dimension that takes into account CG factors are determined, and then the suitable measures of these metrics are determined. The proposed model comprises 15 measures of inputs, 13 measures of process, and 12 measures of outputs, totally 40 measures. After applying Factor Analysis the measures decrease into 36 measures. The proposed model includes financial and non-financial, short run and long run, as well as physical and moral measures. This model considers cause and effect relationships because it deals with the inputs that convert to output passing the processing.

This study examines the importance of performance measures (that take into account achieving CG factors) in achievement the quality of organizational performance by using a survey questionnaire. The results prove these relationships. Moreover, this study examines the importance of individual measures in the proposed model of Input-Process-Output PMS that takes into account CG factors. The results show that 36 of 40 measures are very important; the explanations are provided for these results. Further, this study examines whether there are significant differences in the importance of measures in the proposed model according to applying CG principles; the results confirm there are differences in input and output measures, while there are no significant differences in the importance of process measures between firms apply or not apply CG.

Finally, a case study is conducted in an Egyptian manufacturing company. The results show that the proposed model organizes the information in a clear order, introduces the strengths and weakness in the organizational performance, and concentrates on main activities in business.

In brief, the proposed model is a new perspective in management accounting that needs more

investigation, maybe some modifications and more implementing in many industries. Further, this study should be interpreted in light of several limitations. Firstly, this study depends on CG principles to emphasize the relationship between CG and performance measurement; other studies can depend on CG structures. Secondly, the measures in the proposed model are just examples; other researchers can change or modify them. Thirdly, although a sample size of 128 items was achieved, which is regarded as adequate for many statistical analyses such as T-test and Chi-square, and in most cases factor analysis (Lamminmaki, 2008), a larger sample size would have provided the basis for greater confidence in the results reported.

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