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## **A Framework for the Accounting Determinants of Adopting Stock Option Compensation: Evidence from Egyptian Companies**

### **Abstract<sup>1</sup>**

This study aims at proposing a framework for the accounting determinants of adopting SOC in Egyptian companies. This is done through empirically investigating the relation between company characteristics and the use of SOC. The study includes 64 Egyptian companies, which represent all different sectors at the Egyptian stock market. The study uses a panel data set, from year 2007 to year 2014, in order to enrich the analysis and account for unobserved heterogeneity.

The researcher utilizes the *binary logit regression model* to define the determinants of adopting SOC. The results indicate that the determinants of adopting SOC in Egyptian companies are mainly: *Company Size, Owner Dispersion, Human Capital Intensity, Tobin Q, Leverage and Sector Type*. The study evidenced the prevalence of *the*

*accounting-based determinants* compared to market-based determinants in identifying the factors of adopting SOC. Furthermore, it was observed that there is a general tendency in the sampled Egyptian companies to use SOC as a remedy for some problems like *weak monitoring, agency problem and negative consequences of 25<sup>th</sup> of January revolution*. Finally, the results proved that SOC satisfied the roles that it was initially issued for, in terms of efficiency and effectiveness.

### **Introduction**

Nowadays, there is a strong tendency towards shedding light on the importance of compensation system and how to construct an optimal incentive contract. This importance stems from the fact that, compensation system can be seen as a key innovation for solving agency problem, improving the performance of employees, and consequently the value of the company as whole, or as another tool for manipulation and opportunistic behavior!

Therefore, different arguments about the kinds and components of the compensation plans, and their effect- on the choice of accounting policies, the performance of managers and employees, and the company value- arise to control such practice. In addition, laws, regulations, accounting standards and theories were issued to discipline and define the concept and the structure of the com-

<sup>1</sup> This research depends partially on my PHD thesis that is titled: "A Framework for the Accounting Determinants of Adopting Stock Option Compensation: Evidence from Egyptian Companies". Supervised by: Prof. Dr./Mohamed Abd El-Hamid Tahoun, Professor of Financial Accounting, Department of Accounting, and Prof. Dr./Ahmed Abd El-Malek Hassan, Professor of Financial Accounting Department of Accounting.

performance-based pay system arises to complement the traditional compensation system, in order to be more efficient and effective at strengthening the company value and realizing the goals of interested parties. In other words, it arises to help closing or at least minimizing what is called by the researcher as an **“Interest Gap”**; *the gap between the interest of the company employees and managers on one side (internal parties’ interests), and the outside interested parties<sup>2</sup> on the other side.*

Accordingly, Festing and Sahakiantz (2011); Fritzen and Samani (2010); Jones et al. (2006) and Frye (2004) suggested the use of the stock option compensation (SOC) as an important component of the compensation plan, that could aligns the interests of managers and employees with those of shareholders. SOC is a form of compensation given in exchange for services provided by executives, managers or employees. This form of compensation is a function of stock prices, thus it helps in tying the compensation contract to the management and/or the employees’ performance in a positive way. Nevertheless, it is not a genius tool, but rather the best method available in aligning the interest of interested parties in a way that guarantees maximum benefits and minimum manipulation compared to cash-based compensation. Besides, Booth (2010) showed that both types of compensation - cash and SOC - are subject to similar cash constraints as the SOC requires cash to repurchase the company shares that will be granted to employees or

managers. This indicates that SOC is a complementary component to the compensation plan, rather than a substitution for the cash-based compensation plan.

Moreover, with the issuing of the SFAS No.123 (R) (FASB 2004), which mandated the recognition of SOC in the face of the financial statements, both types of compensation became income deductible (with a similar effect on cash flows and income). Accordingly, Skantz (2012) and Aboody et al. (2004) suggested that recognizing SOC will decrease the manipulation by the managers and increase the efficiency of the compensation contracts. There will be nothing to hide!

Thus, in order to understand how to use SOC plan efficiently, it is important to define and structure the main determinants and roles that can be accomplished by using SOC. These determinants and roles have been defined and categorized differently by many studies, such as Jorn et al. (2012); Fritzen and Samani (2010); He (2008); and Jones et al. (2006)., Based on previous studies<sup>3</sup>, the most important categorization that significantly determines the adoption of the SOC plan was the *accounting determinants*. On the other hand, regarding the roles, previous studies defined two important roles from the efficiency perspective: the monitoring role and the motivational role. However, the researcher suggests that in order to have a framework for the accounting determinants of SOC, the effectiveness role must be integrated as a third role that has to be fulfilled by SOC plan.

<sup>2</sup> The researcher defines, for the purpose of this research, interested parties as shareholders and debtholders.

<sup>3</sup> E.g., Jorn et al. (2012) and Fritzen and Samani (2010).

Internationally, many countries use SOC plan as part of their compensation plan (e.g., Finland, India, German and U.S.A) from long period of time. However, in developing countries, especially in Egypt, it is a more recent issue that is not structured or widely used by most companies. Most of the Egyptian companies reported SOC for employees and managers or even executives as one number. This is called rewarding and incentive stocks or employees' expenses with a note disclosure. The additional disclosures explain the exact amount that was paid for each group (e.g., Orascom Telecom, CIB, and NSGB). Others reported it as managers' and employees' incentive stocks or as administrative expenses, such as El Nasr clothing and Textile Co. (KABO), and Orascom construction industry, or by its name as a SOC/share-based payment for the directors, such as GB Auto.

Accordingly, to investigate the SOC as a complementary component of the incentive plan for Egyptian companies, we need to define the main determinants of such a plan and the importance of its role. *Therefore, the rationale of the current research is to investigate the relation between company characteristics and the use of SOC in order to propose a framework for the accounting determinants of adopting SOC in Egyptian companies.*

### **The Research Problem**

SOC has been in the spotlight in recent decades, especially for developed countries. Accordingly, there are different arguments about the roles and motivation for its use that arise from the effect of this kind of plan on the choice of accounting policies, managers' performance and the company value. Ho-

wever, not much attention has been given to this area in the developing countries in general, and Egypt in particular.

Thus, the researcher intends to address the accounting determinants of using SOC and presents a proposed framework for these accounting determinants concerning the Egyptian companies.

### **The Research Objectives and Importance**

Most of the studies that addressed SOC focused on the results of adopting SOC on the performance of the company, market valuation and the stockholders' or the bondholders' wealth. However, there is relatively less research investigating the determinants and the reasons for adopting this kind of incentive plan, especially in developing countries in general, and no study (to the best of our knowledge) has investigated these determinates in Egypt in particular. Thus, investigating the determinants of using SOC provides relevant information regarding the characteristics of the companies that are candidate for using SOC, the benefits of SOC versus cash-based compensation, and why SOC is an important component of the incentive plan.

### **The Research Limitation**

The researcher did not intend to discuss certain topics in this study that represent areas that require a separate research and another methodology. Thus, the researcher recommends them to further as follows:

- ❖ The researcher did not investigate *the types of SOC* in this study, which

were only mentioned as a description for the structure of SOC at the Egyptian companies.

- ❖ The researcher did not discuss the differences *before* and *after* the adoption of the stock option compensation for the adopter companies.

## The Research Plan

In order to achieve the objective of this research, the researcher classified this study into three parts, as follows:

- I. The Literature Review and Hypotheses Development
- II. The Empirical Study and Analysis
- III. The Research Summary and Conclusion

### I. The Literature Review and Hypotheses Development

**Literature review presented in this section can be classified into three parts:**

1. Theories and Compensation Contracts.
2. The Laws, Regulations and the Accounting Standards of SOC.
3. The Accounting Determinants of SOC and the Hypotheses Development.

### Theories and Compensation Contracts

Several important theories; namely *Agency Theory*, *Expectancy Theory*, and *Optimal Contracting Approach*, can help in explaining the objectives of the research and provide the base for analyzing the structure of compensation contracts.

Concerning *Agency Theory*, researchers over the years considered it as the base for compensation contracts due to

its vital role in defining the principal-agent relation. The key assumption in this relation is the conflict of interest between the managers' goals (agents) and the shareholders' interests (principals). Thus, the absence of an efficient mechanism to discipline such a relation will distort the balance and encourage opportunistic behavior by the managers. This, in turn, will deter the principal from paying compensation for such opportunistic behavior from agents. Accordingly, the self-interest motive of the agents will rise in order to maximize their wealth at the expense of the shareholders (Fritzen and Samuni, 20-10). Such a dilemma creates what is called by the researcher "*a collapsed relation*". This collapse in the relation creates the need for an efficient mechanism, which can help in regulating and disciplining the relation between the principal and the agent by motivating managers to work for the interest of the company shareholders, and providing shareholders with a proper tool for monitoring managers' performance.

With respect to the *Expectancy Theory*, a rewarding system based on performance will increase the motivation of employees and managers to achieve a high level of performance in order to receive the reward they are seeking in order to satisfy their needs. This theory highly considers the managers' point of view, as it helps in determining the key variables that can alter the performance of employees, in order to achieve intended goals (Parijat and Bagga 2014 and Lunenburg 2011). Park and Sturman (2012) and Vroom (1964) clarified that pay-for-performance plans became well known as a result of the *Expectancy Theory*, as it clarifies the relation be-

tween employees' performance and the compensation they receive.

Furthermore, compensation contracts are affected by two types of forces; (a) the *market force*, which focuses on maximizing shareholders' value, but is not sufficient to ensure an optimal compensation contract, and (b) the *managerial power*, which partly focuses on achieving the personal values of the managers, and it is not sufficient too. The latter, claims that managers departures are essentially and then, optimal contracting is not sufficient to explain compensation practice alone. Thus, the *optimal contracting approach* recognizes that, managers need an adequate incentive to maximize shareholders' wealth. Thus, the optimal contract should not only focus on maximizing the business outcomes and satisfying the needs of the shareholders, but also achieving a balance between the two types of forces. That is what *the optimal contracting approach* seeks to do through designing an optimal incentive package for both. This contract formalized either by a proper agreement between principal and agent or by market forces (Bebchuk and Fried 2003 and Bebchuk et al. 2002).

The compensation contract is a mechanism designed in a way that helps company in achieving its goals. Thus, it is neither a "one-size-fits-all solution" nor an inefficient tool in controlling opportunistic behavior by managers and protecting shareholders' wealth. Therefore, each company has to make its own trade-off, weighing the benefits of the compensation plan against its costs, in order to achieve a balanced structure according to its intended objectives (Jo-

rn et al., 2012; Peng and Röell, 2008; Schallheim et al., 2005).

There are two broad types of compensation contracts: cash-based and equity-based compensation (EBC). In most cases, these two types are integrated into one contract, but sometimes they are used separately. Several studies (e.g., Thompson et al., 2016; Jorn et al., 2012; Booth, 2010; Fritzen and Samani, 2010) provided support in favor of EBC in general and SOC in particular compared to cash-based compensations, as they are linked to performance. They clarified that the equity-based systems tend to motivate employees and managers to raise the level of their performance in order to receive the intended reward, which in turn will be reflected in increasing the firm market value.

The EBC contract was classified by Frye (2004), according to time dimension, into two main plans; (a) *the retirement plan*, which is vested over a long period of time (as pension plans and profit-sharing plans<sup>4</sup>), and (b) *the non-retirement plan*, which is vested over a shorter period of time compared to retirement plan (as stock options -the main focus of this study, restricted stock plans<sup>5</sup>, and stock purchase plans<sup>6</sup>).

<sup>4</sup> This is the most prominent plan in the Egyptian companies in comparison to the non-retirement plans that are not widely used.

<sup>5</sup> Restricted stock plans grant shares of stocks to the employees. Although most of the restricted shares are granted to executives and directors, some companies provide these incentives to lower-level managers and employees (Frye 2004). In addition, Bhagat and Romano (2009) defined restricted stock plans as granted stocks that cannot be sold for a specified period of time. Specifically, the recipient does not have the right to benefit from the stock until the end of the vesting period.

More specifically, with respect to the SOC, Booth (2010), Fritzen and Samani (2010), and Hall and Murphy (2003) argued that SOC is the best component of the compensation plan that can be tied to performance. It provides a direct link between the company value (represented by stock price, which is the main concern of shareholders), and the compensation of employees and executives (pay-based performance). In addition, Daneshfar (2015) and Schallheim et al. (2005) clarified that the importance of SOC stems from its motivating effect. They resembled it to a cyclical effect, that is, SOC can motivate managers and employees to work harder in order to maximize their rewards, which in turn would increase the company value and induce the owner to reward them, and so on. Furthermore, Nohel and Todd (2005) considered SOC as the most effective way, from the cost-benefit perspective, to motivate risk-averse managers to increase the ceiling of their investment.

In contrast, Bebchuk and Fried (2003), Bertrand and Mullainathan (2001), Stabile (1999), and Blanchard et al. (1994) explained that other kinds of compensations that are not EBC can be weakly linked to performance (e.g. cash and bonus) without inducing managers' efforts. Therefore, managers will be rewarded regardless of the total value of the company. In this regard, Stabile (1999) explained that cash-based compensations derive their importance from

the symbolic meaning of cash itself to some individuals, as human mind is accustomed to highly valuing cash compensations.

## 1. The Standards, Laws and Regulations of SOC

In this part, the researcher presents the International Financial Reporting Standards issued by **IASB** (International Accounting Standards Board), the USA Accounting Standards issued by **FASB** (Financial Accounting Standard Board), the Egyptian Accounting Standard **EAS.39**, Egypt Code of Corporate Governance (**ECCG**) and the requirements of the Egyptian Financial Supervisory Authority (**EFSA**).

### 2.1 International Financial Reporting Standards (IFRS)

In February 2004, the International Accounting Standards Board (**IASB**) issued **IFRS 2 Share-based Payment**. It aimed at specifying the financial reporting by an entity that reported the share-based payment transaction. The entity is required to measure directly the value of the acquired goods and services and the corresponding increase in the equity at the fair value of the goods and services received. In the absence of a reliable measure for goods and services received, the entity should use the fair value of equity instruments granted, based on the market price at the granted date. Sometimes it is difficult to determine the market price of equity instruments or a similar one with similar terms and conditions, hence, the fair value of the options granted has to be es-

<sup>6</sup>Equity-stock-purchase plans (ESPPs) allow employees to purchase company stocks at a discount of their market value (Frye 2004). Festing and Sahakiantz (2011) defined ESPPs as share-based incentive schemes that allow company employees to acquire company shares on preferential terms.

timated using an option-pricing model like “Black Scholes- Merton formula”<sup>7</sup>.

## 2.2 Relevant Accounting Standards in USA

The accounting for stock option compensation (SOC) started in the 19-90s, although the initial standard of the stock option by the *Accounting Principles Board (ABP Opinion No. 25)* was issued in 1972. This opinion required companies to use the intrinsic value method. **In 1995, The FASB issued SFAS No. 123- Accounting for Stock-Based Compensation;** this statement represents a financial accounting and reporting standard for stock-based compensation plans. Those transactions must be valued based on the fair value of the goods or services received or the fair value of the equity instruments issued at the grant date, whichever is more reliably measured and should be recognized over the vesting period<sup>8</sup>. For SOC, the fair value is determined using an option-pricing model like “Black Scholes- Merton formula”. SFAS 123 entitled certain disclosure in the financial statements about SOC transaction of the entity regardless of the method used. The disclosure requirements of the SFAS 123 were effective for fiscal years beginning after December 15, 1995. **In 2002, the FASB issued SFAS No. 148 “Accounting for Stock Based Compensation-Transition and Disclo-**

**sure”;** this statement amended SAFS 123, *Accounting for Stock-Based Compensation*. It provided guidance for the transition to fair value-based method for SOC transactions. In addition, it required a clear disclosure of the accounting methods used in evaluating SOC in both annual and interim statements.

**In December 2004, the FASB issued SFAS No.123 (Revised);** this statement is a revision of SFAS No. 123, *Accounting for Stock-Based Compensation*. It eliminated APB Opinion No. 25 and its related implementation guidance. SFAS 123 (R) addressed transactions that were addressed previously by SFAS 123. However, this statement is primarily concerned with the share-based payment transaction (SOC) with employees. SFAS 123 (R) required an entity to measure the cost of services received from employees in exchange for an award of equity instruments, based on the fair value of the award at the grant date. This cost will be *recognized* over the vesting period. Fair value of that award will be re-measured periodically at each reporting date through the settlement date. The differences in fair value will be recognized as compensation cost over that period. SFAS 123 (R) was effective for the reporting period beginning after June 15, 2005 for public entities and after December 15, 2005 for non-public entities.

## 2.3 Egyptian Accounting Standards and Regulations

In 2006, the Minister of Investment issued the Egyptian Accounting Standards (EAS) as per decree No. 243/2006 to replace current ones issued under the two ministerial decrees No. 503/1997 and 345/2002. These standards included

<sup>7</sup> Black-Scholes option pricing-model: calculated in accordance to: exercise price of the option, expected term of the option, current market price of the stock, expected dividends, expected risk-free rate of return, and expected volatility of the stock.

<sup>8</sup> Vesting period: the period over which an employee is required to provide service in exchange for equity instrument – the requisite service period.

**EAS No.39 Share-based payment.** The standard aimed at clarifying how the entity should prepare its financial statements in the case of adopting share-based payment transaction (SOC). EAS.39 obligates the entity to recognize the effect of expensing share-based payment plan in its financial statements according to the fair value of equity instruments based on the current market price. In the absence of market prices, fair value is estimated using a suitable valuation technique to estimate the price of those equity instruments on the measurement date. EAS.39 is consistent with the IFRS 2 in the accounting treatment of share-based payment transactions. Thus, after the year 2006, all listed Egyptian companies were required to recognize their SOC as an expense in their income statements.

## 2.4 The Egyptian Code of Corporate Governance (ECCG)

The Egyptian code of corporate governance consists of a set of standards and guidelines based on the principles of corporate governance in Egypt. Those rules are considered complimentary and should be applied with other companies' provisions stated by different laws. This code was divided into nine divisions, for the purpose of this research, the researcher will focus on the issues of BOD, specifically, the following resolutions:

a. The resolutions **No. 3.13** entitled that the received compensation by the executive BOD should be disclosed in the company annual report, including all the required details, such as type of compensation, whether remuneration, allowance, real privileges, SOC or any other financial form. In addition, compensation relat-

ed to performance is highly recommended to constitute a large portion of the total compensation package.

b. The resolutions **No. 3.14** stated that, regarding the SOC, the committee must consider the long-term effect of the board members decisions, not only the short-term, in granting the SOC to encourage the executives to improve the company value consistently.

## 2.5 The Requirements of the Egyptian Financial Supervisory Authority (EFSA)

Recently, on Jan. 22, 2014, the Board of Directors of the Egyptian Financial Supervisory Authority (EFSA) issued new listing and de-listing rules of securities on the Stock Exchange as per decree No.11/2014, according to the latest amendment done by the EFSA No. 170 for the year 2014, decree No. 114, and decree No.124 for the year 2015. These rules are the legal framework governing the procedures and legislation of listing, ongoing listing and de-listing of securities on the stock exchange. The important issues to the objective of this research are *issue No. (40) The Board of Directors Report* and *issue No. (50) Rewarding and motivating system of employees and managers through the ownership of shares.*

They stated that a Board of Directors, who wants to adopt one or more of the rewarding and motivating systems for employees and managers through the ownership of shares or a promise to own stocks, is committed to present a detailed statement of the rules and procedures for the application of rewarding systems to the Stock Exchange.

## 2. The Accounting Determinants of SOC and Hypotheses Development

In this part the researcher will define and analyze the determinants of using SOC, by specifying the three main roles that should be fulfilled by SOC. Then, based on the results of the studies addressed, the researcher can derive the current study hypotheses and structure the research proposed framework for using SOC.

The determinants of SOC are the characteristics of a company, whether internally or externally, that predict the use of the SOC. The internal one is related mainly to the characteristics of the company such as size, earnings, growth, corporate governance, leverage, and cash flow ....etc. However, the external determinants are those related to market conditions; such as stock price and shares-return performance (Fritzen and Samani 2010).

Some researchers (e.g., Jorn et al. 2012 and Fritzen and Samani 2010) defining them in terms of the type of measures as accounting-based measures and market-based measures. Accounting based measures are connected to the company performance such as return on total assets, Tobin's Q<sup>9</sup>, return on invested capital, while, market based measures are mostly connected to the market condition and mainly to the stock price such as share return, total share return and dividends yield. They suggested that the two measures together are necessary to address the main determinants of SOC. However, their studies evidenced a non-significant relation between market measure and the

adoption of SOC. Therefore, the researcher will focus on the accounting measures of the performance that were evidenced by the previous studies to have a strong significant relation with the adoption of SOC.

Other researchers in the area of the determinants of SOC categorized them according to the objective of using SOC to achieve two main roles: *monitoring role*, which is related to the corporate governance characteristics and firm size (e.g.: Jorn et al. 2012; Fritzen and Samani 2010 and He 2008) and *motivational role*, that is related to keeping and attracting new skilled employees and entrepreneurs (e.g.: Jones et al. 2006 and Ittner et al.2003). These two determinants focus mainly on the efficiency of using compensation. They are consistent with the widely accepted definition of efficiency as the best use of available resources to achieve the maximum benefits possible (P C. 2013)<sup>10</sup>. In this case, employees and company structure are the available resources and SOC is the tool that could direct them to perform optimally and improve the value of the company.

In addition, Mouzas (2006) clarified that efficiency is known as "process-success"; it is related to the success of an undergoing operation. It is about structuring systems and operations in the best possible way. It is a necessary condition, yet not a sufficient one. Hence, for any policy or tool to be optimal, it needs to integrate both efficiency and effectiveness to achieve the intended results. Thus, effectiveness must be integrated in designing any sort of policy, as it is the sufficient condition

<sup>9</sup> Tobin's Q (TQ) = Market value of the company \ Total Assets

<sup>10</sup> Productivity Commission, (2013),..Staff Research.

that leads to growth and sustainability. Daft (1995)<sup>11</sup> defined effectiveness as a goal-oriented approach; it represents the ability of the company to achieve its goals. In this regard, Frye (2004) and Fritzen and Samani (2010) addressed some determinants of SOC that can be categorized under the title of the *effectiveness role*. These determinants are more goal-oriented that aim at achieving certain goals by using SOC as part of the incentive plan; for example, higher level of growth, and stock price and lower level of debts and risk.

Thus, together efficiency and effectiveness are required to have an optimal SOC plan. These two perspectives together represent the three essential roles that most companies used to issue SOC in order to attain. These roles are monitoring role, motivational role - that constitute the efficiency perspective - and the effectiveness role. These three roles together define the main accounting determinants of using SOC in companies. *The three roles and their significant determinants, as evidenced by the literature, will be illustrated below.*

### 3.1 The Monitoring Role

The essence and base of the agency theory problem is the difficulty of monitoring the performance of the agents by the principles. Thus, the compensation contracts were used to help solving such a problem and increasing the ability of shareholders in observing the managers performance. However, there is a certain set of factors that can increase the difficulty of monitoring the performance whether at the top or lower level employees. These factors significantly affect the ability of monitoring the per-

formance. With respect to SOC, the current study will focuses on two main variables that evidenced to cause a monitoring problem on one hand, and were significantly related to the use of SOC on the other hand. These variables are company size and ownership concentration.

#### 3.1.1 Company Size

Jorn et al. (2012), Fritzen and Samani (2010), He (2008), Bergman and Jenter (2007), Carter et al. (2007) and Jones et al. (2006) evidenced that there is a significant positive relation between company size and the adoption of SOC. From the monitoring perspective, the larger the company size, the greater the difficulty to monitor the performance; whether externally at the level of "principal-agent", or internally at the level of "managers-employees". In both cases, SOC is considered the most efficient monitoring tool that could decrease many difficulties in monitoring the performance. In addition, it is considered a less costly tool for monitoring compared to outside agents or other costly systems that need a huge infrastructure to be implemented and a specialist to run them (Fritzen and Samani 2010; Carter et al. 2007 and Hannes 2007). *Accordingly, the following hypothesis can be developed in its alternative form:*

***H1: Compared to small-size companies, large-size companies are the most candidates that tend to adopt the SOC plan.***

#### 3.1.2 Ownership Dispersion

This variable addresses the corporate governance concerns and the difficulties shareholders have in monitoring management performance. Daneshfar (2015), Samaha et al. (2012), Fritzen

<sup>11</sup> As cited in Zheng et al., 2010.

and Samani (2010), Jonas et al. (2006), Holmström and Tíróle (1993) indicated that dispersed ownership is one of the important reasons for applying the SOC plan. Small investors, who own a small number of shares, have little power to influence managers' decisions or protect their rights. According to the principal-agent theory and the efficiency perspective, high dispersed ownership means more difficult monitoring of the performance of the agents. Each owner will work for his own interests regardless of the whole company value. Thus, a highly incentive system that motivates them to work optimally for the company and its shareholders is required. Regarding this point, the previous studies evidenced that SOC is the most appropriate candidate to do that. *Accordingly, the researcher can develop the following hypothesis in its alternative form:*

***H2: There is a positive relation between companies that have high ownership dispersion and the tendency to adopt SOC plan.***

Moreover, the efficiency of SOC is not limited to its monitoring role, it is extended to push managers and employees to do more and improve their performance. Therefore, the motivational effect will be illustrated in depth in the following point.

### 3.2 The Motivational Role

Daneshfar (2015), Fritzen and Samani (2010), Dunkan (2001), Kruse (1996) and Jensen and Murphy (1990) clarified that human capital is an important source of capital for many industries in different sectors, especially in IT, energy, healthcare and telecommunications. These sectors depend mainly on the human resources as they consider them their valuable resources.

So, they always search for the skilled unique employees that can add privilege to the company and improve its competitive position in the market.

This trend induces many researchers to search and analyze new tools or systems that can help companies in achieving their target and developing their workforce. In this regard, Fritzen and Samani (2010), Hanns (2007) and Ittner et al. (2003) suggested that good designed compensation contracts, in particular the SOC plan, could accomplish such goal. They illustrated that the core concept of SOC is based on motivating employees by being owners. So, they will be motivated to work for the best of the company and focus on achieving the company goals, which will result in increasing their wealth. In addition, they will keep their loyalty to the company at which they have ownership and give companies the opportunity to attract new skilled entrepreneurs. Simply, SOC will motivate employees to increase company value and consequently increase their reward.

*The motivational role of SOC is based simply on the ability of SOC to link compensation system to performance. It distinguish it from other compensation plans and strength its motivational effect. Therefore, the researcher selected a set of variables, based on the results evidenced from previous studies<sup>12</sup>, to measure the motivational effect of SOC, whether to attract new employees or to keep the current one. The most significant variables were: human capital intensity, market value per employee, and industrial category.*

<sup>12</sup> E.g.: Fritzen and Samani (2010), Jones et al. (2006), Kalmi (2006) and Frye (2004).

### 3.2.1 Human Capital Intensity

Jones et al. (2006) evidenced that there is a positive and significant relation between the ratio of intangible assets as an indicator for the human capital intensity and the use of SOC plan. This implies that the higher the ratio, the more difficulties that can be faced in monitoring employees' performance, and hence a higher need for keeping and motivating them to develop their performance and improving the company value. Otherwise, the company may lose them, which is more costly for the company than granting SOC.

Similarly, Frye (2004) and Core and Guay (2001) supported such positive relations. They explained that companies with high human capital intensity need to link their pay-compensation to performance in order to overcome monitoring difficulties and motivate employees to achieve the company goal. In addition, Frye (2004) indicated that the nonretirement forms of EBC (including SOC) would motivate mostly the hard working and skilled employees, who are confident about their capabilities in achieving the company target and being compensated. She studied such a relation for two different periods of time (1992-1994 and 1997-1999) for a sample of New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ companies. She found a strong and significant positive relation between SOC and human capital intensity for the two time periods.

*In sum, the researcher suggested that SOC is an important component of a compensation plan for those companies that mainly focus on human capital. SOC helps in motivating employees to do their best. Accordingly, the inten-*

*sity of the human capital showed to be one of the important determinants for adopting SOC by companies. Thus, the researcher develops the following hypothesis in its alternative form:*

***H3: There is a significant positive relation between companies with high human capital intensity and the tendency to adopt SOC plan***

### 3.2.2 Market Value per Employee

Jones et al. (2006) illustrated that despite the importance of the human capital intensity in increasing the need for adopting SOC, it is necessary to measure the importance and the efficiency of such human capital. The importance of this variable stems from the fact that not all human capital worth compensation, or the intensity of workers per se may not be the accurate measure of the employees' efficiency. Thus, the study suggested that it is important to measure the market value per employee in order to assess the importance of the employees and the efficiency of compensation granted to them. The study found a positive relation between the market value per employees and the SOC plan. They observed that granting SOC to high skilled employees is more cost efficient<sup>13</sup> than other forms of compensation.

<sup>13</sup> Jones et al. (2006, p. 440) said that: "To understand the basic idea, consider two Companies that have identical growth prospects. However, in Company A, the market value of equity per employee is 2000 units, while in company B it is 1000 units (perhaps because the work is less physical capitalintensive than in Company A). The expected growth rate of market value of equity is 1.0 percent for both Companies. Giving employees options corresponding to 1.0 percent of total equity would yield an expected payoff of twenty units ( $2000 \times 0.1 \times 0.1$ ) in Company A and ten units in Company B. Thus,

Similarly, Kalmi (2005) evidenced that companies with a higher level of market value per employee are mostly using SOC to compensate a selected target group that has a higher market value compared to other employees.

This variable differs from the previous one, human capital intensity, in that it is concerned with the quality of the performance done by the employee. It requires a skilled and entrepreneur employees to accomplish it, and most suitable with selective-based scheme. On the other hand, human capital intensity is concerned with the quantity of the work that should be done by employees, thus, a broad-based scheme is the compatible one with it. Hence, measuring both variables in conjunction with the sector type will help in shedding the light on the motivational role of SOC, as one of the important roles that induces a company to adopt such plan.

*In sum, the researcher agreed with the previous studies on the importance of this variable in determining the efficiency of the compensation granted. Despite of there are few studies that tested this variable. The previous studies resulted in a positive relation between the value of employee in the market and the adoption of SOC. Thus, the researcher expects the market value per employee to be one of the determinants of using SOC. Accordingly, the following hypothesis can be developed in its alternative form:*

***H4: There is a significant positive relation between companies with high market value per employee and the tendency to adopt the SOC plan.***

### 3.2.3 Type of Sector

The motivational role is not only related to the human capital, but also related to the type of the industry or the sector to which the company belongs. Some sectors depend mainly on the financial capital, despite having a large work force, such as financial and construction companies. Others depend on human capital, despite their need for a large amount of finance, such as IT, energy, healthcare and telecommunications. Thus, to get a clear picture of the intensity and importance of the human capital as a determinant of using SOC, it is important to consider the type of the sector to which the company belongs, as one of the variables that constitute the framework for adopting SOC.

Fritzen and Samani (2010) found that it was mostly significant in energy, healthcare and IT, as these industries depend mainly on highly qualified employees. Street and Cereola (2004) and Espahbodi et al. (2002) clarified that high-tech and high-growth companies mainly depend on such incentive plans as a way of motivating their entrepreneurs to improve the business position and the company performance. However, Festing and Sahakiants (2011) found that such a relation is more significant in the financial sector. This result must be taken carefully, as the study was limiting their sample to few sectors. It did not include all other sectors. Therefore, we cannot consider it a general result.

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in Company A the value of a given amount of equity compensation is higher than in Company B. Notice that it is the market value per employee, rather than market value per se, which is relevant for compensation purposes”.

Overall, there is a significant relation between SOC and the type of sector. This relation will help explaining the adoption of SOC in one industry rather than in another. Thus, the researcher develops the following hypothesis in its alternative form:

**H5: There is a significant relation between the type of sector and the tendency to adopt the SOC plan.**

Finally, the previously illustrated roles: monitoring and motivational, of SOC are viewed by researchers as constituting the efficiency perspective that induces a company to adopt the SOC. Both roles complete one another. They work mutually to enhance the company system and build a good framework for the company. The two roles together pivot the road for the company to achieve its intended goals efficiently. This leads to discuss the third role of SOC, according to the researcher's suggested framework, **the effectiveness role**, that will be illustrated in depth in the following section.

### 3.3 The Effectiveness Role

Effectiveness is simply defined as the realizing of the desired results and achieving the defined goals and objectives. Effectiveness of SOC means the ability of SOC plan to satisfy the needs and realize the objectives of all the interested parties in the company. It is a goal-oriented role that focuses on the output of the system (PC. 2013)<sup>14</sup>. Regarding this point, researchers evidenced a significant relation between a set of important variables and the adoption of SOC, mainly: company performance, growth opportunities and leverage ratio.

#### 3.3.1 Company Performance

Frye (2004) investigated the equity compensation package (retirement and non-retirement) for all employees and non-executive employees relative to company performance. The study found that equity-based compensation is positively linked to performance, specifically to the non-retirement plan (specifically SOC). However, Frye (2004) criticized that ROA was only positive for the same year of granting SOC and turns negative in the next years. Bens et al. (2002) explained that ROA declines following the option being exercised, which is attributed to the company reaction to the dilution effect of options. Thus, the decline in the value of ROA is related to the exercise of the option and not to the adoption itself. This is evidence to the importance of the vesting period and the necessity of knowing the right determinants of granting SOC to reap its benefits. With respect to ROA, Jorn et al. (2012) evidenced a positive and a significant relation between firm performance and performance-based pay schemes (including SOC).

*In sum, the previous studies evidenced a positive relation between the company performance and the use of SOC. The studies used different measures of performance, but the one that was mostly used and significantly reflected the effect of using SOC was ROA. Thus, the researcher develops the following hypothesis in its alternative form:*

**H6: There is a significant positive relation between companies with a high level of ROA and the tendency to adopt the SOC plan.**

<sup>14</sup> Productivity Commission Staff Research Note May 2013.

### 3.3.2 Growth Opportunities

Carter et al. (2007) and Kato et al. (2005) suggested that companies that adopt SOC are characterized by high level of growth opportunities than non-adopting companies. They evidenced a strong relation between SOC and the level of growth opportunities of the company. Moreover, Bryan et al. (2000); Guay (1999); Barber et al. (1996); Bizjak et al. (1993) and Smith and Watts (1992) evidenced that, growth opportunities is one of the most important determinants of executives' stock option compensation. They illustrated that companies with higher level of growth opportunities encourage their executives to work harder and engage in more risky and high return investments in order to increase their compensation. Further, Carter et al. (2007) and Kato et al. (2005) suggested that, companies that adopt SOC are characterized by high level of growth opportunities than non-adopting companies. They evidenced a strong relation between SOC and the level of growth opportunities of those companies. Chung and Charoenwong (1991) indicated that, investment opportunities imply a certain level of risk that most of the managers are afraid to take. Thus, the company has to motivate managers to take such a risk through a good performance-based compensation.

Regarding TQ, Frye (2004) evidenced a causality relation between the use of EBC and performance. The study indicated that this notion is valid with regard to TQ, as she found a significant positive relation between TQ and the EBC. This implies that the use of EBC improves performance, which induces the company to pay higher level of compensation that will motivate the em-

ployees to work harder. In this regard, Bozec, Dia and Bozec (2010); Shan and McIver (2011); Kapopoulos and Lazaritou (2007) and Demsetz and Villalonga (2001) illustrated that, TQ measures the effectiveness of the company performance in the long-run. It reflects the ability of the company to leverage the value of its investments up to the market value compared to company book value. The use of the market value in this measure reflects the external market condition that is not related to managers' performance. Thus, it considers one of the market-based measures that complete the other accounting measure of performance in order to get a complete framework of SOC determinants.

*In summary, the studies evidenced that EBC (especially SOC) compensation is positively tied to high future performance. Thus, the researcher expects that there will be a strong and a significant relation between company growth opportunities, measured by TQ, and the adoption of SOC plan. Hence, the following hypothesis is developed in its alternative form:*

***H7: There is a significant positive relation between companies with high growth opportunities and the tendency to adopt SOC plan.***

### 3.3.3 Leverage ratio

Sun (2012) and John and John (1993) indicated that according to the agency theory, the compensation contracts should be designed not only to align the interests of management and shareholders, but also to reduce the cost of debt. Thus, an optimal structure of the compensation system should not only depend on the agency relation between shareholders and managers, but also on

the other agency relations, such as contracts with external claimholders (e.g., suppliers and consumers), as all have the same level of importance for the company success and sustainability. Also, Schallheim et al. (2005) signified a negative relation between granting SOC and debt level. They indicated that companies that focused mainly on the agency cost of debt are less likely to grant SOC as compensation.

Jorn et al. (2012), Frye (2004) and John and John (1993) evidenced a negative relation between the adoption of SOC and the company leverage ratio. They also identified the debt ratio as one of the determinants of adopting SOC plan. John and John (1993) argued that the management compensation should be structured in a way that realizes stability and sizable total cash flows, in order for both claimholders and shareholders to gain. However, if the management compensation is designed to only minimize the agency costs, this may induce the managers to enter into risky strategies that give rise to high agency costs of debt.

*Accordingly, the researcher is more supportive for the negative relation be-*

*tween leverage ratio and SOC. Thus, the following hypothesis is developed in its alternative form:*

***H8: There is a significant negative relation between the companies with a high level of leverage and the tendency to adopt the SOC plan.***

*In sum, each one of the three variables constitutes one of the determinants that cause companies to use SOC. Using SOC improves companies performance, whether in the short-run or in the long-run, and whether at market level or at specific industry level. SOC helps strengthening the company image in front of their debtors and shareholders.*

*Consequently, investigating and analyzing the previously illustrated roles of SOC plan will help the researcher to highlight the main significant determinants of using SOC, and assess their importance and their value added as a complimentary part of the incentive plan in Egyptian companies. The following is the proposed framework of the determinants for using SOC in Egyptian companies.*

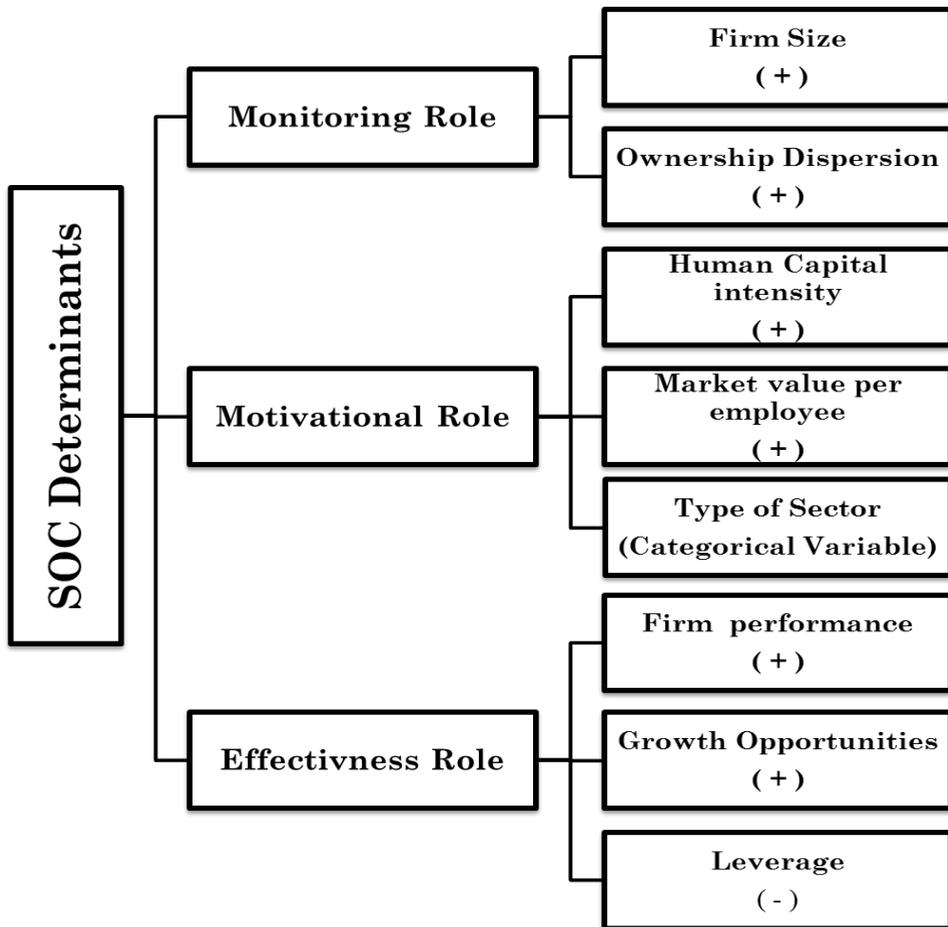


Figure 1: A Framework for the Accounting Determinants of SOC<sup>15</sup>

<sup>15</sup> Source: Developed by the researcher.

## II- The Empirical Study

This part illustrates how the data and variables were chosen, collected and analyzed to estimate the accounting determinants of adopting SOC at the Egyptian companies for the period from 2007 to 2014. In addition, it presents the statistical techniques and the accounting ratios that were used throughout this research to model the determinants of adopting SOC at the Egyptian companies, in light of the Egyptian Company Act No.159/1981, corporate governance principles and EAS.39. The researcher follows the *deductive* approach to test the appropriateness of the proposed framework within the Egyptian environment through a set of specified hypotheses. *Accordingly, this part is divided into three main parts, as follows:*

1. *Data and Variables Selection*
2. *The Statistical Tests and Model Estimation*

### 1. Data and Sample Design

The research was developed using real data in actual market conditions. This fact supports the creditability and the reliability of the research results. Data were gathered from different sources. The main source was the official published annual reports of the listed Egyptian companies obtained from Egyptian for Information Dissemination (EgID), published periodicals of Kompas Egypt, Egyptian Exchange yearbook (EGX), and Disclosure Book for the active 50 listed Egyptian companies. A direct contact was made with a representative of Cofass Egypt to obtain the number of employees of some companies, and with some official repre-

sentatives such as auditors, accountants and one of the previous CEOs of HSBC.

The researcher selected the listed Egyptian companies that kept going with their activities inside the Egyptian market from 2007 to 2014. As a result, the main sample comprised **64** listed companies from 4 sectors (refer to Appendix A). This sample was then divided, according to granting SOC, into two groups: adopters and non-adopters of SOC. Adopters are **15** companies across different sectors (refer to Appendix B). Those companies are the only Egyptian companies, whether listed or not, that adopted the SOC as part of its compensation systems, whether to employees, managers and/or CEOs, for the selected period. Some of the adopters started earlier at 2007, while others started later, and most of the companies that started at 2007 continued granting SOC to 2015.

The data were extended over a long period of time and across all Egyptian sectors, which help the researcher to verify differences in results over time and across different types of sectors. Therefore, the researcher uses a panel data set, from year 2007 to year 2014, in order to enrich the analysis and account for unobserved heterogeneity.

The analysis is based on a fairly comprehensive set of independent variables that are hypothesized by researcher to affect the companies' choice of adopting SOC. A summary of the variable definition and measures are presented in the following Table:

**Table 1: A Summary of the Selected Variables**

<b>Variables</b>	<b>Variables label</b>	<b>Measurement</b>
<b>Dependent variables</b>	<b>SOC-Usage</b>	0 = Do not use SOC 1 = Use SOC
<b>Independent variables</b>		
<b>Monitoring role</b>		
<b>1. Size of the company</b>	<b>Size</b>	Log of total assets
<b>2. Ownership Dispersion</b>	<b>Owner</b>	The percentage of the free float = the percentage of shares available to outsiders related to the total number of shares outstanding
<b>Motivational role</b>		
<b>3. Human capital intensity</b>	<b>HR</b>	Intangible Ratio = (Intangible assets/Total assets)
<b>4. Market value per employee</b>	<b>MV Emp.</b>	Company Market value \ Number of employees
<b>5. Sector Type</b>	<b>IND</b>	categorical Variable with 4 levels <sup>16</sup>
<b>Effectiveness role</b>		
<b>6. Company Performance</b>	<b>ROA</b>	Return on Assets = Net Income/Total assets
<b>7. Growth opportunities</b>	<b>TQ</b>	Tobin's Q = Market value of the company \ Total Assets
<b>8. Leverage</b>	<b>Leverage</b>	Leverage Ratio= Total debt/ Total Asset

<sup>16</sup> Type of sector: this variable is a dummy variable with four levels; *Industrial sector, construction & real estate sector, services sector, and financial sector*. This classification of sectors was done by the researcher in accordance to the mission and the purpose of each company that declared at ESX, in addition to, the general classification of the economic sectors in Egypt. This classification was done to reduce the number of the dummy variables in the model to facilitate the statistical analysis of the model. The original classification by ESX was 17 sectors- see Appendix C -that could complicate the analysis.

## 2. The Statistical Tests and Model Estimation

This section is dedicated to empirically testing and analyzing the accounting determinants of adopting SOC at the Egyptian companies for the period from 2007 to 2014. In the context of achieving the objectives of this research, the methods and techniques used in previous studies were studied closely. This gave the researcher some guidance as to which method better reflects the relation between the variables. Although the methods used in this research are not identical to previous studies, they are still comparable to them. The researcher utilized the statistical package “STATA/MP 13&14”, since it has been considered as one of the best statistical packages available to deal with panel data and multivariate analysis. In addi-

tion, the researcher used “IBM SPSS Statistics 22” for the bivariate analysis. Accordingly, the collected data were analyzed and examined to test the proposed framework discussed in section 3 using *Binary Logit Regression Model*.

### 2.1 Univariate Analysis

Univariate analysis is a descriptive analysis that provides insight to the characteristics and the patterns of the data collected. It is a preliminary step for the bivariate analysis and multivariate analysis.

The research sample consists of **64** companies listed at the Egyptian stock exchange (ESX) from 2007 to 2014 across all sectors of ESX. The number of those companies across sectors is provided at Table 2.

**Table 2: Number of Companies per Sector**

	Number of companies	Percent
<b>Industrial</b>	21	32.8%
<b>Construction</b>	17	26.6%
<b>Services</b>	14	21.9%
<b>Financial</b>	12	18.7%
<b>Total</b>	<b>64</b>	<b>100%</b>

The companies are spread across four main sectors, the highest one with **33%** is the industrial sector and the least one with **19%** is the financial sector. All the Egyptian sectors are represented in the sample (see appendix C).

In the context of the research purpose the sampled companies are reclassified in accordance to the usage of SOC across sectors into two main groups as shows in Table 3.

**Table 3: Frequency of SOC Usage per Sector**

	Industrial	Construction	Services	Financial	Total
<b>Do not Use SOC</b>	155	111	92	65	423
<i>% of total</i>	37%	26%	22%	15%	82.62%
<b>Use SOC</b>	13	25	20	31	89
<i>% of total</i>	15%	28%	22%	35%	17.38%
<b>Total</b>	168	136	112	96	<b>512</b>

As observed from Table 3, SOC is mostly used by financial sector as they reach **35%**, then construction with **28%**, and lastly industrial and services sector with **22%** and **15%** respectively. Mo-

reover, the usage of SOC varied across the years of the study. The following Table 4 illustrated the difference in the usage of SOC across years of the study.

**Table 4: Number of Companies Using SOC per Year**

	Industrial	Construction	Services	Financial	Total	% of Total
<b>2007</b>	0	2	2	2	<b>6</b>	<b>7%</b>
<b>2008</b>	2	2	2	2	<b>8</b>	<b>9%</b>
<b>2009</b>	3	3	2	2	<b>10</b>	<b>11%</b>
<b>2010</b>	3	4	2	5	<b>14</b>	<b>16%</b>
<b>2011</b>	3	4	3	5	<b>15</b>	<b>17%</b>
<b>2012</b>	1	4	3	5	<b>13</b>	<b>15%</b>
<b>2013</b>	1	3	3	5	<b>12</b>	<b>13%</b>
<b>2014</b>	0	3	3	5	<b>11</b>	<b>12%</b>
<b>Total</b>	<b>13</b>	<b>25</b>	<b>20</b>	<b>31</b>	<b>89</b>	<b>100%</b>

Table 4, shown that, the usage of SOC has started gradually after the issuing of the new standards in 2006 that included *EAS.No. 39 Share-based payment*. In general, before 2007 there were not Egyptian companies granting SOC to their employees at any level of employees. More specifically, there was not any disclosure about the SOC

at their financial reports<sup>17</sup>; it was discretionary. Then, at 2011 the usage of SOC reaches its maximum for all sectors, then start to decrease gradually until 2014. Such fluctuation in the usage of

<sup>17</sup> Orascom Construction industries—according to the researcher's knowledge—was disclosing SOC at their financial statement before 2007.

OSC over years clarify that, there are real factors that affect the usage of SOC among companies. It's obvious that, the usage of SOC starts formally from 2007 at the Egyptian market, but it comes under the spot light recently with the issuing of the new listing and delisting rules of securities on the Stock Exchange per decree No.11/2014. More specifically, Issue No. (40), The Board of Directors Report, which obligates the

companies to disclose all the details of granting SOC.

A descriptive analysis is conducted for the independent variables that are hypothesized by the researcher to have a significant effect on the usage of SOC. A summary of those statistics are shown in Table 5 for years from 2007 to 2014.

**Table 5: Summary for Descriptive Statistics of Independent Variables from 2007 to 2014 across the Two Categories of SOC**

SOC	Stats	Size	Owner	HR	MV. Emp.	ROA	TQ	Leverage
Do not use	Mean	6.0299	0.3867	0.0233	6.9790	0.0590	-.4370	.4050
	Median	6.0715	0.3557	0.000	6.9772	0.0401	-.4272	.3920
	S.D	0.8075	0.2291	0.0723	1.8710	0.0843	.8892	.2374
	Min.	3.8212	0.000	0.000	0.000	-0.1649	-2.9347	0.000
	Max.	7.8789	1.000	0.4958	13.7439	0.4837	5.6049	.9282
	N	<b>423</b>						
Use	Mean	7.0106	0.4188	0.0843	7.5075	0.0416	-0.7320	0.6159
	Median	7.0555	0.4090	0.0277	7.7457	0.0268	-0.8618	0.6665
	S.D	0.6963	0.2192	0.1093	1.3301	0.1002	0.9037	0.2710
	Min.	5.3977	0.0078	0.000	4.0401	-0.3844	-2.8694	-0.0079
	Max.	8.1578	0.9214	0.4613	10.8268	0.6969	1.1761	1.2204
	N	<b>89</b>						

Table 5 illustrated the two main groups of SOC in the Egyptian companies for the given sample. Accordingly by comparing values of two groups, especially mean and median, they reveal that; those use SOC is higher than those do not use SOC-those companies that only use cash-based compensation- with respect to *Size*, *Owner*, *HR*, *MV.Emp* and *leverage*. On contrast, *ROA* and *TQ* their values are little bit lower for those uses SOC compared to the other group.

Additionally, those using SOC have a higher minimum for *Size* and *MV.Emp*, while those do not use SOC have a higher maximum values for *MV.Emp* and *TQ*.

Regarding sectors type, a descriptive analysis of the independent variables across sectors is conducted and shown in Table 6, to explain the differences between the companies use and do not use SOC across sector.

**Table 6: Summary for Descriptive Statistics of Independent Variables from 2007 to 2014 across the Sector Categories**

Stats		Size	Owner	HR	MV. Emp	ROA	TQ	Leverage
<b>Industrial Sector</b>								
Don't Use	Mean	5.990074	0.411379	0.025463	6.464836	0.07556	-0.2006	0.374367
	S.D	0.734648	0.257796	0.053104	1.36086	0.102715	0.679561	0.195187
Use	Mean	6.658142	0.298629	0.026507	6.039096	0.031563	-0.5432	0.546327
	S.D	0.416732	0.078268	0.014233	1.044331	0.032271	0.426176	0.120767
<b>Construction &amp; Real Estate Sector</b>								
Don't Use	Mean	5.695759	0.397498	0.001135	7.117258	0.062342	-0.38822	0.421373
	S.D	0.707915	0.186559	0.003373	1.727823	0.084235	0.873597	0.222318
Use	Mean	6.774483	0.472168	0.048613	8.041778	0.076009	-0.12598	0.595106
	S.D	0.820003	0.195704	0.082744	1.300975	0.143083	0.96233	0.182971
<b>Services Sector</b>								
Don't Use	Mean	6.050764	0.314556	0.037276	6.473815	0.047642	-0.47021	0.295888
	S.D	0.766756	0.203786	0.107429	2.038508	0.062492	0.977429	0.172019
Use	Mean	7.215375	0.360838	0.143286	7.299702	0.0268	-0.59912	0.82683
	S.D	0.549157	0.181039	0.096152	1.5547	0.119231	0.758059	0.14642
<b>Financials Sector</b>								
Don't Use	Mean	6.665935	0.411397	0.036044	8.684136	0.029985	-1.03675	0.604592
	S.D	0.833111	0.239715	0.099883	1.895354	0.044289	0.961926	0.304156
Use	Mean	7.216803	0.463615	0.099395	7.826433	0.027661	-1.38555	0.525848
	S.D	0.672072	0.272231	0.136155	0.74986	0.047967	0.665855	0.358836

Table 6 illustrates that the sample is divided into 4 sectors with different proportion as shown previously at Table 2. There are differences between the two groups of SOC across industries whether at means or standard deviations. For the industrial sector the two groups of SOC are fairly similar except for Size. While for the other 3 sectors there are obvious differences between the two groups especially for the Size and H.R.

However these numbers is an absolute number and drive a preliminary conclusion about the patterns of the independent variables. Thus, to improve and prove these results, a bivariate analysis should be conducted to determine the significance of these differences and the usefulness of the research variables to build the research model.

## 2.2 Bivariate analysis

Before conducting any kind of significance statistical tests on the independent variables, it is important to test for the normality of the data distribution. According to the results of the normality test, the relevant statistical significance tests will be determined. *Shapiro-Wilk test* were conducted to check the normality of the data. It reveals that the variables are not normally distributed, which directed the researcher to the non-parametric analysis. Table 7 presents the results of *Shapiro-Wilk test*<sup>18</sup>.

<sup>18</sup> Its null hypothesis: the "x<sub>s</sub>" is normally distributed. Thus, at p-value < 0.05 we reject the null hypothesis and conclude that the variables are not normally distributed.

**Table 7: Summary Results of Shapiro-Wilk Test**

Stats	Size	Owner	HR	MV. Emp.	ROA	TQ	Leverage
Obs.	512	512	512	512	512	512	512
Z	3.089	5.325	11.769	2.739	9.405	5.541	6.153
P-Value	0.0010**	0.000**	0.000 **	0.0031**	0.000**	0.000**	0.000 **

\*\*Significant at the 0.01 level

To determine the significance of the difference between the two independent groups of the samples according to the usage of SOC, *Mann-Whitney U test*<sup>19</sup> is conducted as shown in Table 8.

**Table 8: Summary Results of Mann-Whitney U Test of Significance Level**

Stats	Size	Owner	HR	MV. Emp.	ROA	TQ	Leverage
Z	-9.452	-1.635	-7.172	-3.227	1.872	2.986	-6.509
P-Value	0.0000**	0.1021	0.000 **	0.0013 **	0.0611 *	0.0028 **	0.000 **

\*\*Significant at the 0.01 level.

\* Significant at the 0.1 level.

The results of the *Mann-Whitney U test* evidenced a significant difference between companies adopt SOC and the other group of companies that didn't adopt SOC – those using cash-based compensation. The significant differences were proved for all variables except for *Owner* that shows insignificant difference between the two groups.

This evidenced the importance of these variables as determinants for the adoption of SOC in the Egyptian companies. Furthermore to determine the direction of these differences between both groups a *Mann-Whitney Mean ranks* table is presented as follows;

<sup>19</sup>*Mann Whitney U Test* is a non-parametric test that mostly used as an alternative for the t-test. Its null hypothesis is: the distribution of “x<sub>s</sub>” is the same across the two groups of SOC. Thus, at p-value < 0.05 we reject the null hypothesis and conclude that the variables are significantly different across groups of SOC.

**Table 9: Summary Results of Mann-Whitney Mean Ranks and Median Differences for SOC Usage**

SOC	Stats	Size	Owner	HR	MV. Emp.	ROA	TQ	Leverage
Do not use	N	423	423	423	423	423	423	423
	Mean Rank	228.15	251.6	237.02	246.82	262.12	265.46	236.98
	Median	6.071543	0.355700	0.000	6.977178	0.040086	-0.42723	0.392014
Use	N	89	89	89	89	89	89	89
	Mean Rank	391.22	279.8	349.09	302.49	229.81	213.93	349.28
	Median	7.055478	0.409043	0.0277	7.745713	0.026808	-0.86185	0.666522
Total	N	512	512	512	512	512	512	512

Table 9 illustrates that, companies that use SOC has higher mean rank and median values for *Size*, *Owner*, *HR*, *MV .Emp.*, and *Leverage* than companies that don't use SOC. These results are consistent with the results reached before at the univariate analysis.

Regarding the sector classification *Kruskal-Wallis Test*<sup>20</sup> was conducted to

signify the differences between the independent variables across 4 sectors simultaneously. It is a non-parametric test that is used to test the differences among more than two independent samples of equal or different sample sizes. In contrast to *Mann-Whitney U test* that tests the differences between only two independent samples.

**Table 10: Summary Results of Kruskal-Wallis Test**

	Size	Owner	HR	MV. Emp	ROA	TQ	Leverage
Chi-Squared (3)	74.664	18.794	59.814	93.174	24.771	67.639	31.797
P-value	0.0001**	0.0003**	0.0001**	0.0001**	0.0001**	0.0001**	0.0001**

\*\*Significant at the 0.01 level

Table 10 indicates that, there is a significant difference across the 4 sectors for all the independent variables. This evidenced the heterogeneity effect of the sectors across the independent variables. In other words, the research variables are significantly differed across the sectors of the Egyptian mar-

kets. For more classification of the sector effect across the two group of the SOC, *Mann-Whitney U test* is conducted to specifically determine the difference between those companies adopting SOC and those do not adopt SOC-using cash-based compensation- across each sector separately.

<sup>20</sup>Its null hypothesis: the distribution of "x<sub>i</sub>" is the same across the categories of the sectors. Thus, at p-value < 0.05 we reject the null hypothesis and conclude that the variables are significantly difference across groups of SOC.

**Table 11: Summary Results of Mann-Whitney U Test per Sector across Categories of SOC**

	Stats	Size	Owner	HR	MV. Emp.	ROA	TQ	Leverage
<b>Industrial</b>	Z	-3.173	1.54	-3.5580	1.0060	1.926	1.861	-3.072
	<i>P-Value</i>	0.0015**	0.1234	0.0004**	0.3143	0.0541**	0.0627*	0.0021**
<b>Construction</b>	Z	-5.115	-2.705	-3.813	-2.643	-0.84	-1.475	-3.598
	<i>P-Value</i>	0.0000**	0.0068**	0.0001**	0.0082**	0.401	0.1403	0.0003**
<b>Services</b>	Z	-5.553	-2.051	-4.664	-2.036	0.813	0.463	-6.951
	<i>P-Value</i>	0.0000**	0.0402**	0.000**	0.0418**	0.4163	0.6431	0.0000**
<b>Financial</b>	Z	-2.644	-0.678	-2.309	2.699	-0.396	1.548	0.7010
	<i>P-Value</i>	0.0082**	0.4979	0.0209**	0.0069**	0.6923	0.1217	0.4831

\*\*Significant at the 0.01 level.

\* Significant at the 0.1 level.

Table 11 shows that there is a significant difference between the two groups of SOC for each sector. These differences are not identical for all sectors, as each sector has its own effect on the independent variables. They are agreed on the significant difference of *Size* and *H.R* as the two important variables that differentiate the adopter of SOC from the non-adopter of the SOC across sectors. Otherwise, each sector shows its own unique effect on the independent variables. For example, *ROA* is only significant at the industrial sector, while *MV. Emp* and *Owner* is significant at all sectors except industrial sector. Moreover, *leverage* is significant at all sectors except for the financial sector. Combining the results of Table 10 with Table 11, it's obvious that each sector has its own characteristics that significantly affect the adoption of SOC in the Egyptian companies.

Furthermore, the sample is extended from 2007 to 2014, during this time an important events happened in Egypt that is expected by the researcher to have a significant effect on the adoption of SOC. At the beginning of 2011 the *25<sup>th</sup> of January revolution* took place, such event affects deeply many sectors of the Egyptian companies causing many changes and consequences. This fact was clearly published in the financial reports of many companies at different sectors. Also, it could be observed at Table 4 that the adoption of SOC reaches its pick at 2011 and then starts to decrease gradually until 2014. Thus, the researcher divides the sample into two independent samples; before and after *25<sup>th</sup> of January revolution* to test its effect on the research independent variables. The appropriate test to identify the significant of such differences is the *Mann-Whitney U test* as shows in Table 12.

**Table 12: Summary Results of Mann-Whitney U Test, Mean Ranks and Median Differences for the 25<sup>th</sup> of January Revolution Effect**

Stats		Size	Owner	HR	MV. Emp	ROA	TQ	Leverage
Before 25 Rev	Median	6.148324	0.33860	0.000	7.339464	0.056975	-0.19995	0.424066
	Mean rank	247.90	244.31	249.63	265.54	301.90	295.47	255.28
After 25 Rev	Median	6.223194	0.38255	0.0000	6.987233	0.022975	-0.69149	0.412085
	Mean rank	265.10	268.69	263.38.	247.46	211.10	217.53	257.72
Z		-1.316	-1.864	-1.161	1.382	6.943	5.96	-0.186
P-value		0.1883	0.0623*	0.246	0.1668	0.000**	0.000**	0.852

\*\*Significant at the 0.01 level.

\* Significant at the 0.1 level.

The *Mann-Whitney U test* reveals that there is a significant effect of 25<sup>th</sup> of January revolution on the performance of the company, represented by *ROA* and *TQ* that shows a lower level of both median and mean rank after revolution. In addition, it affects the ownership dispersion that shows higher mean rank and median after revolution. These results are considered a true reflection of the Egyptian market that suffered from a low level of performance after 25<sup>th</sup> of January revolution compared to before revolution. Besides, its effect on the level of ownership at the Egyptian companies is due to the investors fear from losing their investments and thus capital flows out of Egypt. Accordingly, it's necessary to include the effect of 25<sup>th</sup> of January revolution as a *control variable* that could affect the adoption of *SOC* among the Egyptian companies; especially that it took place at the middle point of this research.

Finally, to conduct the binary regression model, there is a necessary assumption that must be satisfied which is referred to as a multicollinearity problem. For this purpose, the researcher conducts a *Pearson correlation test*, to stand on the strength of the collinearity between the independent variables, in addition to calculate the *variance-inflating factor (VIF)*<sup>21</sup> to check for multicollinearity problem. The estimated coefficient *r* is used to calculate the *VIF*. The *VIF* shows how the variance of an estimator is inflated by the presence of multicollinearity. As the *VIF* approaches infinity, the extent of collinearity between *Xs* (independent variables) increases. Therefore some authors use the *VIF* as an indicator of multicollinearity. A **rule of thumb**, if the *VIF* of independent variables exceeds 10, the higher the collinearity between the variables (Gujarati 2004).

<sup>21</sup> **Variance-Inflating Factor (VIF)** =  $1 / (1 - r^2_{x1x2})$

**Table 13: Summary Results of Pearson Correlation Test and VIF**

	Size	Owner	HR	MV employee	ROA	TQ	Leverage
Size	1	-0.2245	0.2561	0.2577	-0.024	-0.4245	0.5438
VIF		1.053	1.070	1.071	1.001	1.219	1.419
Owner	-0.2245	1	-0.1106	0.0574	-0.116	0.0776	-0.1053
VIF	1.053		1.0123	1.003	1.0136	1.006	1.0112
HR	0.2561	-0.1106	1	0.0074	-0.1093	-0.1056	0.0228
VIF	1.070	1.0123		1.0001	1.0121	1.0113	1.001
MV employee	0.2577	0.0574	0.0074	1	0.1283	0.215	0.0078
VIF	1.071	1.003	1.0001		1.017	1.049	1.000
ROA	-0.024	-0.116	-0.1093	0.1283	1	0.4429	-0.2673
VIF	1.001	1.0136	1.0121	1.017		1.244	1.077
TQ	-0.4245	0.0776	-0.1056	0.215	0.4429	1	-0.4581
VIF	1.219	1.006	1.0113	1.049	1.244		1.265
Leverage	0.5438	-0.1053	0.0228	0.0078	-0.2673	-0.4581	1
VIF	1.419	1.0112	1.001	1.000	1.077	1.265	

Table 13 shows that all VIFs did not exceed **1.4**, which is statistically below the conventional levels of experiencing a multicollinearity problem with the model independent variables.

*In sum, the previous analysis proves the importance and the significance of the research independent variables on the decision of adopting SOC in the Egyptian companies for the period of the study. In addition, it proves the importance of combining time series and cross-section observations through the panel data analysis to obtain an efficient estimate of the determinates of adopting SOC, and the importance of 25<sup>th</sup> of January revolution as a control variable during the period of the study. Consequently, multivariate analysis is*

*conducted to test the research model and precisely define the roles and the determinants of adopting SOC at the Egyptian companies.*

### **2.3 Multivariate Analysis**

This model is a key step in the analysis that was used to identify the determinants of adopting SOC in the Egyptian companies for the period from 2007 to 2014. It was used to verify the research model and answer the main questions of this research. When the dependent variable is categorical, it only takes values 0 and 1. In this incident, using ordinary regression leads to inefficient estimation of the model, which could be addressed by using logit regression model. Logit regression is distinguished by using all information in-

corporated in the data to estimate the overall simultaneous effect of the independent variables on the probability of using SOC. It uses maximum likelihood estimation rather than least squares estimation that is used in traditional multiple regression. For a meaningful interpretation, the marginal effects<sup>22</sup> were calculated and reported in all the results. Finally, it should be noted that in logistic regression models, goodness of fit is of secondary importance. What matters most in these models is the es-

$$P(SOC)_{it} = 1/[1 + \exp^{-(\beta_0 + \beta_1 \text{Size}_{it} + \beta_2 \text{Owner}_{it} + \beta_3 \text{HR}_{it} + \beta_4 \text{MV Emp}_{it} + \beta_5 \text{IND}_{it} + \beta_6 \text{ROA}_{it} + \beta_7 \text{TQ}_{it} + \beta_8 \text{Leverage}_{it} + \beta_9 \text{25 Rev.}_{it} + \text{wit } 24)]$$

Where:  $P(SOC)_{it}$  is the probability of adopting SOC (dependent variable) in the Egyptian companies, for year "t", and company "i",  $\exp$  is the exponential function, it is about (2.718). It is the base of the logit model,  $\beta_0$ : is the model intercept, **Size** is the company size, it measured by the Log of total assets, **Owner**- Ownership dispersion- is the percentage of the free float, **HR**- human capital intensity- is the ratio of the intangible assets to the total assets, **MV**

estimated sign of the regression coefficients, their statistical significance and the significance of the model (Cooper and Schindler, 2012 and Pampel, 2000).

Accordingly, a binary logistic regression model was conducted, that allows for two categories of response for the dependent variable. Since, the binary logit regression predicts the probability of SOC (dependent variable), the equation of the research model can be illustrated as follows:

**Emp** is the company market value per number of employees, **IND** is the sector type, it is a categorical variable with 4 levels, **ROA**- Return on Assets -is equal to net income to total assets, **TQ**- To-bin's Q- is the market value of the company to total assets, **Leverage** is measured by leverage ratio-total debt to total asset, and **25 Rev.**- 25<sup>th</sup> January revolution- is a nominal variable that has two statistical levels of analysis: "0" represents the period before the revolution, and "1" stands for the period after revolution.

The sample was extended over a long span of time (8 years) and across different sectors of the ESX (cross-sections). It is a **balanced panel** as each company (cross-sectional unit) has the same number of time series observations (repeated consistently for 8 years). Panel data models enable the construction and testing of more complicated behavioral models by studying the determinants of adopting SOC over time and within each sector. Generally, there are two types of panel data regression models (Gujarati 2004; and ScottLong

<sup>22</sup> Partial derivative of the nonlinear equation relating the independent variables to the probabilities is defined as: *marginal effect* =  $ey/dx$ , but more intuitively represents a straight line that meets the logistic curve at a single point without crossing to the other side of the curve. It gives the percentage change in the dependent variable for a unit change in the respective independent variable (Gujarati 2004; Wooldridge 2002; and Pampel 2000).

<sup>23</sup> Since there are four sectors, the researcher used 3 dummy variables to account for sector effects, with one dummy variable used as base to compare with.

<sup>24</sup>  $Wit = \epsilon_i + uit$  ( $i = 1, \dots, N$  is a firm index;  $t = 1, \dots, T$  is a year index). The composite error term  $wit$  consists of two components:  $\epsilon_i$ , which is the company specific error component, and  $uit$ , which is the combined time series and cross-section error component (Gujarati, 2004).

and Jeremy 2001): the “Fixed Effects” and the “Random Effects” Model. However, choosing between the two models is not an arbitrary decision, it requires a specific test to be conducted to select the appropriate model for the research. The test was developed by Hausman in 1978<sup>25</sup>, which has a *chi-square distribu-*

*tion*. Its null hypothesis is that the FE and RE estimators do not differ substantially. If the null hypothesis is rejected, the conclusion is that RE is not appropriate and that we may be better off by using FE. Below, Table 14 summarizes the results of the test.

**Table 14: Summary Results of Hausman Test**

Variables	Coefficients		Differences	SQRT(diag(V_b-V_B)) S.E.
	(b)	(B)		
Size	12.81882	20.04475	-7.225929	.
Owner	2.320813	-0.2999677	2.62078	0.2560985
HR	-3.822108	-41.37032	37.54821	.
MV employee	-1.569657	-2.244891	0.6752345	.
ROA	-7.162488	1.078153	-8.240641	.
TQ	1.387997	1.797658	-0.4096615	.
Leverage	-4.486755	-5.877164	1.390409	.
25 REV.	0.2106676	-0.8009383	1.011606	.
$Chi^2(8) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 2.24$ <b>Prob&gt;chi2 = 0.9727</b> <i>(V_b-V_B is not positive definite)</i>				

*b = consistent under Ho and Ha; obtained from xtlogit*

*B= inconsistent under Ha, efficient under Ho; obtained from xtlogit.*

Since the p-value of  $chi^2 = 0.9727 > 0.05$ , the null hypothesis is not rejected at  $\alpha= 5\%$  and the researcher concludes that the RE regression will provide efficient and consistent estimators, and thus, it is the method chosen by the researcher to estimate the research model.

The first step in estimating the binary regression model is conducting the *Likelihood Ratio Test* for the significance of the model. The result of the test is given by LR chi-square test; it is equivalent to the F-test in the linear regression model. Below, Table 15 summarizes the results of the binary logistic regression model (Random Effect)

<sup>25</sup> Gujarati (2004)

**Table 15: Summary Results of Binary Logistic Model (Random Effect)**

P (SOC)	Margins (b)	Z	P-value
Size	9.2361	4.47	0.000***
Owner	6.1287	2.11	0.035**
HR	9.0312	2.18	0.029**
MV employee	-1.6628	-3.72	0.000***
ROA	-11.1168	-1.46	0.145
TQ	1.8002	2.79	0.005***
Leverage	-5.9840	-1.92	0.055*
25 REV.	1.1670	1.84	0.065*
Sector Effect			
Industrial	-3.1595	-2.22	0.026**
Construction	6.0063	2.77	0.006***
Services	-1.6908	-1.06	0.288
N			
	512		
<i>LR Chi-Square(11)</i>	33.34761		
<i>P -value</i>	0.00046***		
<i>log likelihood</i> <sup>26</sup>	-80.40273		
<i>Pseudo McFadden's R<sup>2</sup></i> <sup>27</sup>	49.34%		

\*\*\*Significant at the 0.01 level

\*\*Significant at the 0.05 level

\* Significant at the 0.1 level

The p-value for the *LR Chi-Square test* is less than 0.05. Thus, the researcher rejects the null-hypothesis that the intercept-only model and the research model are equal, and concludes that the research model provides a better fit than the intercept-only model. Also, this reveals the significance of the research variables in predicting the usage of SOC (dependent variable).

Table 14 reflects that the model variables, except *ROA* and *services sector*, are significantly associated with the adoption of SOC in the Egyptian companies for the period from 2007 to 2014. The estimated results show that the *size* of the company has a statistically significant positive effect on the

<sup>26</sup> The log likelihood value reflects the likelihood that the data would be observed given the estimated parameters. The larger the value (i.e., the closer the negative value to zero), the better the parameters will do in presenting the observed data. Despite its importance, it has little intuitive meaning by itself. Thus, to get a meaningful interpretation of its value, the value of the log likelihood has to be compared with other models (Cooper and Schindler 2012 and Pampel 2000).

<sup>27</sup> **McFadden's R<sup>2</sup>** compares the full model value (LL<sub>full</sub>) to the initial or baseline value, assuming that all the  $\beta$  coefficients equal zero with just intercept parameter (LL<sub>constant</sub>). The improvement relative to the baseline in the log likelihood model shows the improvement due to the independent variables. This statistic does not mean what R-squared means in OLS regression. **A Pseudo R<sup>2</sup> measure does** not represent the explained variance since log likelihood functions do not deal with variance. Logistic regression does not have a measure equivalent to the R-squared that is found in OLS regression (Cooper and Schindler 2012 and Pampel 2000).

adoption of SOC for the overall sample firms. The marginal coefficient of the adoption of SOC with respect to size is + 9.24; that is to say that a 1% change in size leads to a 9.24% change in the probability of adopting SOC. This reflects a large percentage of change for the adoption of SOC for the whole sample. Accordingly, the researcher rejects the null hypothesis at 0.01% and concludes that there is a **significant positive effect of Size** on the probability of adopting SOC, as hypothesized by the researcher “**H1**”.

Also, ownership dispersion shows a significant positive effect on the probability of adopting SOC by 6.13%. This implies that the dispersion of the ownership encourages companies to adopt SOC in order to monitor managers' performance and increase company value. This means rejecting the null hypothesis at 0.05% and concludes that there is a **significant positive effect of Ownership dispersion** on the probability of adopting SOC, as hypothesized by the researcher “**H2**”.

Consequently, by combining the effect of *size and owner*, it is obvious that both have significant positive effects on the adoption of SOC. These results are consistent with the essence of the agency theory and pay-based performance concept. They indicate that in case of large companies and dispersed ownership; there is a difficulty in monitoring the performance of employees at all levels or even managers and CEOs. Thus, a compensation system that is based on performance will help in decreasing such problem, unlike the cash-based compensations that were always questioned for causing agency problems and earning management. Thus, one could

say that SOC is used as an efficient and less costly tool to help Egyptian companies overcome the monitoring problem compared to using cash-based compensation per se. *These results are consistent with Daneshfar (2015); Samaha et al. (2012); Jorn et al. (2012); Fritzen and Samani (2010); Carter et al. (2007) and Hannes (2007).*

Regarding the second set of variables that present the motivating role of SOC, the researcher found a significant positive effect of H.R on the probability of adopting SOC by 9.03%. It is the second significant variable in terms of large effect on the probability of adopting SOC after the size effect. This variable reflects the intensity of human capital at the Egyptian companies, and thus, there is a need for a compensation system that could motivate them to work hard and keep their loyalty. This means rejecting the null hypothesis at 0.05% and concludes that there is a **significant positive effect of H.R** on the probability of adopting of SOC, as hypothesized by the researcher “**H3**”.

On the contrary to the researcher's prediction, the variable M.V Emp showed a significant negative relation with the probability of adopting SOC by - 1.7%. This result indicates that the Egyptian companies do not evaluate their employees according to their skills or unique abilities. However, they focus on the number of employees, rather than the quality of the selected employees. This feature could be justified by the concept of the cost-benefit analysis, as skilled and proficient employees will require high level of compensation and expect high level of privilege, which will cost companies a lot. Thus, one could conclude that most Egyptian co-

panies depend more on the low-level employees than skilled employees in order to reduce their level of compensation with regard to SOC compensation. Moreover, it could evidence the weak effect of the market-based measures compared to other accounting-based measures. This means rejecting the *positive effect of M.V Emp* hypothesized by the researcher and concludes a significant negative one with relation to the adoption of SOC “H4”.

Regarding the sector type effect, the researcher selected the *financial sector* to be the base for comparison with the rest of the sectors, since it is the one with the highest adoption level of SOC by 35%. The results indicate that the probability of adopting SOC at the *industrial sector* is lower than that at the financial sector by 3.15%, and is higher for *construction sector* by 6%, with insignificant relation with service sector. These results are consistent with the negative effect of the M.V Emp., as the service sector mainly depends on skilled employees rather than on the mass number of employees like other sectors, such as construction. These results indicate that the adoption of SOC differs significantly across sectors. Accordingly, the researcher rejects the null hypothesis and concludes that there is a *significant effect of the sector type* on the probability of adopting of SOC, as hypothesized by researcher “H5”.

Hence, by combining the effect of H.R, M.V Emp and Sector Type, the researcher concludes that the motivational role of SOC at the Egyptian companies is related to the number of employees and the type of sector that companies belong to rather than to the quality of their employees. These results

indicate that the Egyptian companies are focusing on keeping and motivating their current employees instead of attracting new one. Accordingly, one could say that these results are consistent with the expectancy theory and performance-based concept. They indicate that a rewarding system based on performance will increase the motivation of employees and managers to achieve a high level of performance in order to receive the reward they are seeking and satisfy their needs. *These results are consistent with Fritzen and Samani (2010) and Jones et al. (2006).*

Therefore, by combing these results with the previous one, *Size and Owner*, one could conclude that the Egyptian companies facing greater difficulties in monitoring employee’s performance. Thus adopting SOC will motivate both managers and employees to do their best in maximizing shareholders’ wealth and company value as a whole. In addition, it provides the principal with a good opportunity to monitor the performance of the agent, and thus reduce the information asymmetry on one hand, and activates the “reverse monitoring” by peer employee on the other hand.

*Thus, the efficiency perspective of adopting SOC- presented by motivational and monitoring roles - indicates that larger companies with high human capital intensity and dispersed ownership are the main adopters of SOC. The common factor between them is the difficulty of monitoring and the inefficient processing system to manage their employees. They use SOC as a treatment tool to help improving the undergoing performance. This conclusion is con-*

*sistent with what has been evidenced by previous studies (see section 3 part1).*

Additionally, the effectiveness role as proposed by the researcher to be the third essential role of SOC to achieve an optimal compensation policy, is presented by three main variables: *ROA*, *TQ* and *Leverage*. Unfortunately, the p-value of the **ROA** indicated that, whether at 5% or 10% level of significance, it has no significant effect on the adoption of SOC at the Egyptian companies. This means the researcher accepts the null hypothesis and concludes that there is an **insignificant effect of the ROA** on the probability of adopting SOC, opposite to hypothesis "H6". On the other hand, both *TQ* and *Leverage* show significant effects with 1.80% and -5.98%, respectively, on the probability of adopting SOC at the Egyptian companies. This means the researcher rejects the null hypothesis and concludes that there is a **significant effect of both TQ and Leverage** on the probability of adopting SOC, as hypothesized by the researcher at "H7" & "H8". These two variables indicate the commitment of the Egyptian companies toward their shareholders and debt-holders. *These results are consistent with Bozec, Dia and Bozec (2010); Shan and McIver (2011); Demsetz and Kapopoulos and Lazaretou (2007) and Villalonga (2001). They illustrated that TQ measures the effectiveness of the company performance on the long-run. Additionally, Kato et al. (2005) and John and John (1993) argued that considering the cost of debt-leverage ratio in constructing the compensation system helps keeping the stability and a sizable total cash flow, which improves the company image in front of its debtors. This is consistent with the core of the agency theory. Ho-*

*wever, the insignificant effect of the ROA may be due to the fact that the adopter companies are not considering the number of net income to worth compensation. This could be justified by many reasons; the simplest one is the earning management. Thus, one could say that the effectiveness role of SOC is partially fulfilled in the Egyptian companies.*

Regarding the accounting determinants, the model evidenced the prevalence of them compared to market-based measures. This notion is obviously declared by the marginal coefficients of Size, Owner, H.R and leverage. They have the highest marginal effects compared to TQ and M.V Emp. This result is consistent with the one evidenced by Jorn et al. (2012).

Moreover, the researcher considers the last variable, **25 Rev.**, as a control variable, due to its deep effect on the sample that could not be ignored. As observed, 25<sup>th</sup> of January revolution was one of the most important events that happened in Egypt and significantly affected the Egyptian economy in general and many sectors in specific. Its effect cannot be ignored; especially that it took place at the middle point of this research. This variable shows a significant positive effect on the probability of adopting SOC by 1.17%. In other words, many companies after 25<sup>th</sup> of January revolution adopted SOC in order to decrease the effects of negative subsequent events and encourage the employees at all levels to work hard for the good of the company. This result is observable at Figure 4-3. *This result is consistent with Quan et al. (2015); Lins et al. (2013) and Lemman and Lins (2003), they evidenced that during crises*

those companies that adopting SOC are more likely to survive and maintain a high performance. Their studies examined the effect of adopting SOC during the financial crisis; in fact, they observed a drop in the performance of those companies that did not adopt SOC during the crisis.

## II. The Research Summary and Conclusion

The analysis showed that about 23.4% of the Egyptian companies are adopted SOC as part of their compensation plan. This percentage is still increasing at the Egyptian stock market that witnessed new adopters at 2016. This increasing trend of adoption demonstrates the importance and effectiveness of SOC in satisfying the roles that it was initiated for. The non-adopter companies are those using cash-based plan to compensate their employees and managers. Their statistics reveal lower indicators of performance compared to those adopted SOC as part of their compensation. This notion was proved by many studies (Booth, 2010; Carter et al., 2007; and Kato et al., 2005) and consistently proved by the binary logit regression model.

The binary logit regression model evidenced the significance of the research model for predicting the accounting determinants of adopting SOC at the Egyptian companies for the period of the study. The estimated binary model evidenced a significant positive effect of *Size, Owner, H.R, TQ, financial sector and 25 Rev*, a negative one for *M.V Emp, Leverage* and industrial sector, and an insignificant effect of *ROA* with the probability of adopting SOC in the Egyptian companies. Besides, it stressed the importance of the account-

ing-based measures compared to market-based measures. The results are consistent with the research hypotheses, except for **H4** and **H6**. Therefore, it could be said that, the determinants of adopting SOC in Egyptian companies are mainly: *Company Size, Owner Dispersion, Human Capital Intensity, Tobin Q, Leverage, and Sector Type*.

It was noticed that the Egyptian companies tend to adopt SOC to reach both the efficiency and the effectiveness of the company performance. In addition, the results showed a predominance of the *accounting determinants* compared to the *market-based determinants*. The two variables that depend on the market value were *MV. Emp* and *TQ*. *MV. Emp* had an opposite effect and *TQ* had a lower marginal effect compared to other accounting determinants (e.g. leverage, size and H.R). These results are consistent with the nature of each measure; as accounting-based measures are objective measures that can be measured and evaluated on a defined basis. They are real indicators of performance and the one appropriate to link the compensation system to. They reflect managers' and employees' efforts. On the other hand, market-based measures are subjective measures of performance, as they are limited by shareholders' way of thinking, perception about the company and their ability of interpreting results. They depend on factors out of the company control, which makes it difficult to link compensation to. Furthermore, it was observed that there is a general tendency in the sampled Egyptian companies to use SOC as a remedy to some problems like weak monitoring, agency problem and negative consequences of 25<sup>th</sup> of January revolution.

## Appendix A: List of Egyptian Companies “The Main Sample”

No.	Reuters Code	ISIN Number	Company Name	Sector
1.	POUL.CA	EGS02051C018	Cairo Poultry	Industrial Sector # 1
2.	SUGR.CA	EGS30201C015	Delta Sugar	
3.	BISM.CA	EGS30481C013	Bisco Misr	
4.	MPCO.CA	EGS02091C014	Mansourah Poultry	
5.	NEDA.CA	EGS52041C018	Northern Upper Egypt Development & Agricultural Production	
6.	ESRS.CA	EGS3C251C013	El Ezz Steel Rebars	
7.	ASCM.CA	EGS10001C013	Asek Company for Mining - Ascom	
8.	IRAX.CA	EGS3D041C017	EL Ezz Aldekhela Steel - Alexandria	
9.	APSW.CA	EGS32331C018	Arab Polvara Spinning & Weaving Co.	
10.	ENGC.CA	EGS3F021C017	Engineering Industries (ICON)	
11.	AUTO.CA	EGS673T1C012	GB AUTO	
12.	ORWE.CA	EGS33041C012	Oriental Weavers	
13.	ELEC.CA	EGS3G231C011	Egyptian Electrical Cables	
14.	NASR.CA	EGS3G191C017	El Nasr Transformers (El Maco)	
15.	KABO.CA	EGS33061C010	El Nasr Clothes & Textiles (Kabo)	
16.	SWDY.CA	EGS3G0Z1C014	Elsweddy Cables	
17.	EFIC.CA	EGS38381C017	Egyptian Financial & Industrial	
18.	SMFR.CA	EGS51191C012	Samad Misr -EGYFERT	
19.	SKPC.CA	EGS380S1C017	Sidi Kerir Petrochemicals	
20.	PHAR.CA	EGS38081C013	Egyptian International Pharmaceuticals (EIPICO)	
21.	BIOC.CA	EGS38171C012	Glaxo Smith Kline	
22.	CERA.CA	EGS3C151C015	Arab Ceramics (Aracemco)	Construction & Real state sector # 2
23.	DCRC.CA	EGS21451C017	Delta Construction & Rebuilding	
24.	ECAP.CA	EGS3C071C015	El Ezz Porcelain (Gemma)	
25.	LCSW.CA	EGS3C161C014	Lecico Egypt	
26.	OCIC.CA	EGS65901C018	Orascom Construction Industries (OCI)	
27.	RUBX.CA	EGS3A221C018	Rubex Plastics	
28.	SCEM.CA	EGS3C401C014	Sinai Cement	
29.	SVCE.CA	EGS3C351C011	South Valley Cement	
30.	DAPH.CA	EGS65081C019	Development & Engineering Consultants	
31.	EHDR.CA	EGS65341C017	Egyptians Housing Development & Reconstruction	
32.	GIHD.CA	EGS65461C013	Gharbia Islamic Housing Development	
33.	MENA.CA	EGS65441C015	Mena Touristic & Real Estate Investment	
34.	PHDC.CA	EGS655L1C012	Palm Hills Development Company	

35.	OCDI.CA	EGS65851C015	Six of October Development & Investment (SODIC)	
36.	AITG.CA	EGS50091C015	Assiut Islamic Trading	
37.	MNHD.CA	EGS65571C019	Medinet Nasr Housing	
38.	UNIT.CA	EGS65061C011	United Housing & Development	
39.	EGTS.CA	EGS70431C019	Egyptian for Tourism Resorts	Services Sector # 3
40.	PHTV.CA	EGS70331C011	Pyramisa Hotels	
41.	ROTO.CA	EGS70281C018	Rowad Tourism (Al Rowad)	
42.	RTVC.CA	EGS70271C019	Remco for Touristic Villages Construction	
43.	SDTI.CA	EGS70571C012	Sharm Dreams Co. for Tourism Investment	
44.	ETRS.CA	EGS42051C010	Egyptian Transport (EGYTRANS)	
45.	EGAS.CA	EGS39011C019	Natural Gas & Mining Project (Egypt Gas)	
46.	GMCI.CA	EGS46051C016	GMC For Industrial Commercial & Financial Investments	
47.	MPRC.CA	EGS78021C010	Egyptian Media Production City	
48.	EMOB.CA	EGS48011C018	Egyptian Company for Mobile Services (MobiNil)	
49.	ORTE.CA /GTHE.CA	EGS74081C018	Orascom Telecom Holding (Global Telecom)	
50.	ETEL.CA	EGS48031C016	Telecom Egypt	
51.	RAYA.CA	EGS690C1C010	Raya Holding For Technology and Communications	
52.	EGSA.CA	EGS48022C015	Egyptian Satellites (NileSat)	
53.	COMI.CA	EGS60121C018	Commercial International Bank (Egypt)	Financial Sector # 4
54.	NSGB.CA /QNBA.CA	EGS60081C014	National Societe Generale Bank (NS-GB) /Qatar National Bank Alahly (QNB)	
55.	UNBE.CA	EGS60051C017	Union National Bank - Egypt "UNB"	
56.	ECIEB.CA	EGS60041C018	Credit Agricole Egypt	
57.	EGBE.CA	EGS60182C010	Egyptian Gulf Bank	
58.	AFDI.CA	EGS69021C011	El Ahli Investment and Development	
59.	HRHO.CA	EGS69101C011	Egyptian Financial Group-Hermes	
60.	EKHO.CA	EGS69082C013	Egyptian Kuwaiti Holding	
61.	NAHO.CA	EGS69182C011	Naeem Holding	
62.	HDBK.CA	EGS60301C016	Housing & Development Bank	
63.	PIOH.CA	EGS691L1C018	Pioneers Holding ABRD.CA	
64.	ABRD.CA	EGS67181C015	Egyptians Abroad for Investment & Development	

## Appendix B: List of Egyptian Companies Adopting SOC

No.	Reuters Code	ISIN Number	Company Name
<b>Industrial Sector #1</b>			
1.	AUTO.CA	EGS673T1C012	GB AUTO
2.	KABO.CA	EGS33061C010	El Nasr Clothes & Textiles (Kabo)
3.	SWDY.CA	EGS3G0Z1C014	Elswedey Cables
<b>Construction &amp; Real Estate Sector #2</b>			
4.	OCIC.CA	EGS65901C018	Orascom Construction Industries (OCI)
5.	OCDI.CA	EGS65851C015	Six of October Development & Investment (SODIC)
6.	MNHD.CA	EGS65571C019	Medinet Nasr Housing
7.	UNIT.CA	EGS65061C011	United Housing & Development
<b>Services Sector #3</b>			
8.	EMOB.CA	EGS48011C018	Egyptian Company for Mobile Services (MobiNil)
9.	ORTE.CA /GTHE.CA	EGS74081C018	Orascom Telecom Holding (Global Telecom)
10.	RAYA.CA	EGS690C1C010	Raya Holding For Technology And Communications
<b>Financial Sector #4</b>			
11.	COMI.CA	EGS60121C018	Commercial International Bank (Egypt)
12.	NSGB.CA /QNBA.CA	EGS60081C014	National Societe Generale Bank (NSGB) / Qatar National Bank Alahly (QNB)
13.	NAHO.CA	EGS69182C011	Naeem Holding
14.	HDBK.CA	EGS60301C016	Housing & Development Bank
15.	PIOH.CA	EGS691L1C018	Pioneers HoldingABRD.CA

## Appendix C: Sector Classification According to ESX

Egyptian Sector Classification	Frequency	Percent
Bank	5	7.8 %
Basic Resources	3	4.7 %
Chemicals	3	4.7 %
Construction & Materials	8	12.5 %
Financial Services	7	10.9%
Food & Beverage	5	7.8 %
Healthcare & Pharmaceuticals	2	3.1 %
Industrial Goods & Services & Automobiles	6	9.4 %
Oil & Gas	1	1.6 %
Personal & Household Products	3	4.7 %
Real Estate	8	12.5 %
Retail	1	1.6 %
Media	1	1.6 %
Technology	2	3.1 %
Telecommunication	3	4.7 %
Travel & Leisure	5	7.8 %
Utilities	1	1.6 %
<b>Total</b>	<b>64</b>	<b>100 %</b>

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