

Beyond Dichotomous Approach, Experts Method Compatibles with an Information System View for Developing a Valid Corporate Governance Index

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Abstract

This paper provides a critical review of the corporate governance quantification process at academic and professional levels to scrutinize the main troubles in the black box of CG assessment models and spot some lights on how to develop a valid Corporate Governance Index (CGI) at the firm and industry levels regarding evenly the entire stakeholders' perceptions. Prior literature has been reviewed and a Corporate Governance index was constructed merging the power of multi-methodologies: Principal Component Analysis (PCA), Delphi Technique and Stability analysis. The findings show that the validity of the results necessitates enforcing End to End processes and taking into account the country's individualization to increase the reliability and comparability of the results. As well, the governance ratings are sensitive to the applied methodology, particularly, a well-known approach in quantifying CG, i.e., dichotomous approach, is underestimated the index findings then it will directly affect all aspects of governance endogeneity with firm's performance/value. This research has important practical implications for governance guidelines setters, companies, stakeholders and other researchers. For the G setters, it underlines the necessity to make harmonization between industries' regulations and governance code, and revise the priority of the "comply or explain" approach in practice; which could serve as a roadmap for future improvements and researches. For companies, this paper highlights which effective G mechanisms and urges the role of the boardroom in monitoring and explanations for non-compliance. For CGI users, the research highlights that ratings' users should be more precautions and concerned about the base of the assessing models.

Keywords: corporate governance index, information system view, Principal Component Analysis, Delphi technique, stability analysis, dichotomous approach

1. Introduction

Sound good governance concept has given, recently, higher priority in the country's development plans for boosting investors' confidence, business integrity and improving access to capital markets (Agyemang et al., 2019, p. 1134). Through coming up with reforms in corporate governance structure, numbers of regulations as a guide of best practices of corporate governance have been introduced; such as Sarbanes Oxley act of 2002 in the USA, Higgs report by 2003 in the UK (Abdullah and Page, 2009, p.7; Pletz & Upson, 2019, P. 1027), also the Australian stock market had issued good governance principles as a benchmark of good practices in corporate governance by 2003 (Linden and Matolcsy, 2004, p. 9).

The initiative of launching a corporate governance code was taken up comparatively late in Germany; the first code of best practice, developed by the Policy Commission Corporate Governance in 2000 (Rühmkorf et al., 2019, p. 1047). Indeed, the Intergovernmental Working Group of Experts on International Standards of Accounting and Reporting (ISAR) has undertaken several actions in terms of Assisting developing countries and transition economies to strengthen their regulatory in order to enhance corporate transparency and accountability, they issued a Guidance of Good Practices in Disclosure as a benchmark of good corporate governance (UNCTAD, 2006).

Developing countries in line with the global trends have encouraged companies to cope with the best practices of corporate governance for monitoring management and minimizing conflicts of interest among principal-agent and principal–principal (Sabbaghi, 2016, p. 868; Kao et al., 2019, p. 738; Crisóstomo & de Freitas Brandão, 2019, P.121), Taiwan financial Supervisory Commission, for instance, set their own Roadmap for 2018-2020 intends to boost active participation of all parties in corporate governance to assist corporate governance culture entrenched, generate an investment-friendly environment and advance companies' global affordability (Financial Supervisory Commission, 2018, p. 3).

From another perspective, international rating agencies have intended to quantify governance practices through developing commercial scoring systems in order to rank companies in terms of their governance practices. For instance, Institutional shareholder services (ISS) launched a Corporate Governance Quotient (CGQ, 2002) and the Corporate Governance quick Score (CGS, 2013) (ISS, 2013) for helping institutional investors to avoid high-risk investment opportunities (Khanchel, 2007), where high rating corporations are more attractive for investors rather than low rating corporations (Mallin, 2003, p. 77; Grimminger & Benedetta, 2013, p1).

Consequently, academic researchers have increasingly run on building individual quantitative models such as GOV- index designed by Klapper and Love (2002), G-index by Gompers et al. (2003) and GOV index for Aggarwal et al. (2007) to name just a few, to test the endogeneity problem of corporate governance mechanisms through clarifying the relationship between corporate governance quality and the firm performance. Despite the intensive efforts in dealing with threats of risks, the dropping of the UK's Carillion company in January 2018 spotting the world light on the rethinking of the activation role of corporate governance

mechanisms (Goergen et al., 2010, p. 58; OECD Report, 2015, p. 3) to act in adherence to the ethical code not merely in compliance with governance rules (Fathi, 2013, p. 3), which can be regarded as a trigger factor for the firm's reputation and integrity (Arjoon, 2006, p. 35).

Beyond different factors of Carillon going bankrupt, the researchers revealed that Carillion buckled under reasons are merely focused on the company's governance structure and its effectiveness on governed the company. Stakeholders have started to question the enforcement of the board of directors and its committees in nominating and compensating the formal executive and non-executive members, and whether the company's boardroom invested in its power to conduct ethically and managing risks mitigating the costs of poor governance (Pratley, 2018; McCulloch, 2018).

But the governance evaluating methodologies failed to test if the company governed ethically because it's merely focused on the existence of monitoring mechanisms, not on the effectiveness of such mechanisms. As it's narrowing the scope of good governance in just respecting a set of regulations, but sound good governance is an organizational culture that manages and regulates the company's internal and external relations and oversight the company effectively (Egyptian Institute of directors (EIOD), 2016).

Undoubtedly, the majority of governance quantification studies do not consider the criterion of validity & reliability. So, it necessitates rethinking of the evaluating methodologies of companies' governance practices; the wider the scope of governance of achieving accountability, transparency, and business integrity, the greater the tangible benefits will be for all related parties.

In this sense, the current study aims at shedding some light on how to construct a valid CG index, considering how the scholars and practitioners approached their prioritization process and enrich the knowledge about the role of experts' views and country individualization at different stages of the assessment model. This study contributes to the corporate governance literature in several ways. First, this study provides advanced initiatives on CG ratings in terms of information system, as far as the researcher knowledge this is the first attempt contributes to study the construction and implementation of governance assessment index regarding information system concepts.

Second, dissimilar with a large amount of the previous literature (Shabbir & Badgett, 2005; Beiner et al., 2006; Haldar & Rao, 2013, Tariq & Abbas, 2013; Black et al., 2017), this study overcomes the lacking of theory to build a composite index derived from national and international corporate governance benchmark using Expert's methods, statistical analysis and stakeholders' perceptions. Third, while several studies used a dichotomous/binary approach (La porta et al., 1998; Gompers et al., 2003); Drobetz et al., 2004; Brown & Caylor, 2006; Arcot & Bruno, 2007; Clacher et al., 2008; Price et al.; 2011) this study assigns different weights for different components using experts' method regarding the deviation on the relative importance of index components and to avoid subjectivity. Fourth, the current study addresses the value to all stakeholders rather than shareholders and bond-holders.

The rest of this paper is organized in three main sections as follows: section 2 narrates the

governance assessment models in the relevant literature, Section 3 states the Theoretical Framework for building the CGI involving the problematic issues related to the construction phase and the proposed solutions regarding to information system view in three sub-sections. The application phase outlines in Section 4, and Section 5 reports the research conclusions and recommendations.

2. Literature Review

Academics and practitioners are in progress to provide and use a quantitative metric that rate companies' governance practices since 1998-1999 when La Porta et al. (1998) and Brunswick UBS Warburg investment bank introduce two different indices - Anti Director Rights index and CG index, respectively- to identify to what extent laws are caring the investor rights in 39 countries (La Porta et al., 1998) for the first index and evaluating the governance structure as a whole for 21 Russian companies from 1999 to 2000 (Rutherford and Costello report, 1999) for the second one.

In the light of the extensive reviewing of commercial governance scoring literature by Daines et al. (2009) and academic scoring models by Nerantzidis (2018); there is no a verifiable and satisfactory formulated of quantifying the governance quality, however, all attempts to quantifying governance aspects seem to agree upon the target (Daines et al., 2009, P.19), There is an ongoing debate on how to assess the firm's governance performance and criticizes the methodological challenges of this procedure (Bhagat et al., 2008; Bozec & Bozec, 2011; Aguilera & Desender, 2012; Nerantzidis, 2016).

In their governance quantifying papers, Moody's rating (2002); Balling et al. (2005); Schnyder (2012); Baldacchino et al. (2015); Nerantzidis (2016); Hitz & Lehmann (2015) acknowledged that rating methodology should meet two main bases. First, the main relevant aspects of corporate governance should be built in the scoring model, second, the procedures to be followed in prioritizing the quality of firms' governance performance. In this respect, matrix 1 summarizes the multi-methodologies applied by academic developers, commercial rating vendors, and professional institutions & stock exchanges in constructing CG assessing models to spell out the problematic issues involved in the construction phase.

The three main sections of Matrix 1, revealed the main steps of building the conceptual framework of CG quantitative models and the implications of such frameworks compared among three main groups of constructors; the researchers; the credit rating agencies and the professional institutions & stock markets. Starting with the first part of the governance scoring methodology in column 4 (entitled benchmark), numbers of accrediting national and international CG benchmarks have been used to evaluate the firms' governance practices. However, international best practices of good governance -OECD principle 1999 revised 2004 and IRRC governance attributes- are common in 3 governance quantitative models.

The focal benchmark followed by researchers and professional institutions is the national governance codes of firms' countries investigated, by 7 models on average, where the combination of national and international governance codes is mostly the domain of

commercial governance models; for three indices used a variety of governance sources. Also, corporate laws, commercial models and even governance literature were followed as a basis for two models to capture their components.

As can be observed in column 5, professional and commercial ratings are used a large set of governance measures compared to academics, by 60 to 24.13 variables on average. Such measures are categorized under different dimensions; just about 4.75, 6, 5.25 pillars are used on average in panel one, two and three respectively. These rooms for diversity in the selection of multitude governance pillars and the criterion can be better understood by means of the lack of theory to ideal the extraction of relevant encompassing governance attributes.

Another disturbance of lacking theory could be the weighting approach, there are conflicting views on how to weighting the extracted governance factors; academics devoted equal weights to all criteria using a dichotomous approach, 6 Non-weighting indexes compared to 2 weighting indexes to avoid subjectivity in measurement and arbitrary weights. Nevertheless, the Equal weights approach has minor significance in practice compared to the weighting approach, where the first one was followed in 2:1 model. Commercial and professional rating providers are reliant on their expertise to assign different weights with concealing on their functional techniques (8 to 3 models respectively) with a lack of disclosure about how to determine such weights.

Correspondingly, the academic scoring models are apparent to be criticized in ranking companies based upon simple summing up of binary attributes through analyzing annual reports and filing a checklist of disclosed or not disclosed governance items without the reasoning of equal weights (Strenger, 2004, p.13, Florou & Galarniotis, 2007, p.984; Schnyder, 2012, p.9). Yet, the grades of calculation based on simply summing up different dimensions and just analyzing the existence or not the existence of G dimensions; underestimated the firms' governance value and failed to identify areas of deficiencies in firms' governance structure and hence areas of improvement (Al-Shiab, 2003, p.222).

To sum up, the great effort was and still to measure the commitment of the best practices of corporate governance ensures the essential role of good governance in motivating business confidence and integrity. However, different scoring models have many similarities specifically their target; concerns arose about construct validity and reliability of such systems. Given the aforementioned methodologies, the variations in the prioritization process are exhibiting the distinction on countries' cultures, regulations, capital markets' efficiency, basis of governance compliances; mandatory or voluntarily.

Those variations stimulate the differentiation on the stock market and stakeholders' requirements; which well-thought-out according to S&P's (2004) as a motivation behind launching a specific governance assessment model for each country, which suited with Arcot & Bruno (2005), Coles et al. (2008), Munisi & Randøy (2013) argument that "one system does not fit all". But which variables could be selected? Whether governance components are equally significant or some are weighty than others? Whether the prioritization process intents to evaluate almost the existence of governance tools or valuing work effectiveness?

Table 1. Analysing of the Academic, Commercial and Professional CG Quantitative Models

Matrix 1: Analysing of the academic, commercial and professional CG quantitative models							
Governance Scoring providers	G Model	Benchmark	Practical Methodology		Index type	Sources of Data	No. of spotlight Companies
			Pillars of CG	Weighting scheme			
Panel 1, Academic providers							
La porta et al. (LLSV, 1998)	Anti-Director Rights	G rules in 39 countries	Shareholders' rights attribute measured by 6 sub-criteria	Equal weights [(0,1) approach]	Scoring from 0 to 6 points	annual reports	Listed firms in 39 countries
Bujaki & McConomy (2002)	Voluntary Disclosure Index	Toronto Stock Exchange guidelines on CG.	25 measures covered 14 guidelines related to board of directors, board committees and disclosure.	dichotomous scoring system [(0,1) approach]	Scoring from 0 to 25 points	290 annual reports in 1997	272 Canadian firms listed in TSE 300 index
Gompers et al. (GIM, 2003)	G-Index, or Anti-Takeover Index	International Responsibility Research Center G measures	24 measures listed in five categories: tactics for delaying hostile bidders; voting rights; director/officer; other takeover defenses; and state laws.	Equal weights [(0,1) approach]	Scoring from 0 to 24 points	Public Information from 1990-1999	1500 US listed companies
Drobetz et al., 2004	Good CG (GCG)	German CG Code	5 provisions measured using 30 variables covering: board role, Shareholders rights, disclosure and control.	Equal weights [(0,1) approach]	Scoring from 0 to 30 points	Questionnaire + annual reports from 1998-2002.	91 German companies
Tsipouri & Xanthakis, 2004	CGI	Blue book (revision of OECD), 1999	37 variables covered 5 attributes: Shareholders rights and responsibilities, transparency & disclosure, auditing, board of directors and governance compliance.	Weighting approach using Expert method	Scoring from 0 to 100	Checklist filing from annual reports	120 Greek companies

Price et al., 2011	CGI	Mexico's Code of Best Corporate Practices	55 internal governance mechanisms used to measure 3 main criteria: board structure; internal control and disclosure	[(0,1) approach]	Percentile index (0-100%)	Questionnaire filling from annual reports (2000-2004)	107 firms listed in Mexico Stock Exchange
Gordon et al., 2012	CGI	G Guideline of Toronto Stock Exchange (TSX)	14 TSX corporate governance guidelines measuring by 22 dimensions	(0,1) approach	Scoring from (0 to 22)	proxy data collected for the TSX companies	1,617 companies traded on TSX
Nerantzidis, 2016	Transparent, reliable & valid CG index	Greek laws for CG, SEV & combined code.	79 variables used to quantify 5 main pillars of Greece firms G practices; board and its member; internal control; shareholders relation & communication; information disclosure and board remuneration	Un equal weights assigned using the AHP approach	Firms evaluating from (0 to 100)	Public information	219 firms in Athens Stock Exchange (ASE)

(Continued)

Matrix 1:

Governance Scoring providers	G Model	Benchmark	Practical Methodology Pillars of CG	Weighting scheme	Index type	Sources of Data	No. of spotlight Companies
Panel 2. Commercial Vendors							
Brunswick (UBS) Warburg, 1999	G Score Index	N	17 measures divided into 8 governance pillars: transparency, share dilution risk, asset transfer and transfer pricing risk, merger and restructuring risk, bankruptcy risk, ownership restrictions, corporate governance initiatives, and registrar risk.	Different weights with Non-disclosure about their approach	overall governance score of 60 points	Public information from financial reports	21 listed firms from 1999-2003

Standard & Poor's (S&P's, 2002)	T&D	Different sources of governance best practices	98 questions covering 3 main governance attributes; ownership structure and investors' rights, transparency & disclosure and board and executive management structure and operations	Equal weights [(0,1) approach]	Percentile index (0-100 %)	Checklist from public information	1500 companies listed in S&P's Global 1200 & 300 in S&P/IFCI
Standard & Poor's (S&P's, 2002)	CGS-I	OECD, 1999 + world bank guidelines + other resources	80 procedures classed under four components; ownership structure and external influences, shareholder rights and stakeholder relations, transparency & disclosure and audit, and board structure and effectiveness	N	Firms overall score ranging from 0 to 10	Checklist from public information	depending on firm demand with fees and without disclosing of results
Moody's, 2002	CGA Index	American and Canadian sources of governance rules	20 measures classify into 7 pillars include board of directors, audit committee, conflict of interest, compensation policies, shareholders rights, ownership structure and transparency.	N	Non disclosed	Annual reports, SEC governance filings and companies' websites	USA & Canadian firms

Credit Lyonnais Securities Asia (CLSA), 2001	CLSA CGI	Different sources of governance rules for Asian countries	7 provisions of governance include disclosure & transparency, board of directors' independence, responsibilities and accountability, equal treatment of shareholders, Environmental awareness and financial discipline measured by 57 sub criterions	equal weights	Percentile from (0 to 100%)	Yes-No questionnaire	25 emerging markets
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(Continued)

Matrix 1:

Governance Scoring providers	G Model	Benchmark	Practical Methodology Pillars of CG	Weighting scheme	Index type	Sources of Data	No. of spotlight Companies
Japan Corporate Governance Research (JCGR, 2005)	JCGR	governance regulations in Japan	8 pillars covered board structure & compensation, charter by law provisions, audit issues, anti-takeovers practices, executives & directors' compensation, board performance review, stock ownership and director's education	Un -equal weights without, disclosure about their method	Percentile ranging from (0 to 100%)	Survey	Listed companies in Tokyo stock exchange

ISS, FTSE, 2005	FTSE ISS CGI	Governance regulations in developed countries	61 measures for 5 main criteria; compensation system, stock ownership by executives and non-executives board members, ownership structure, audit integrity, board of directors' structure and independence.	N	Scoring from 1 to 5.	Governance data provided by ISS	2200 firms in 24 developed countries
Panel 3. Professional Institution & Stock Markets							
Indonesian Institute for Corporate Governance, 2005	Corporate Governance Perception Index (CGPI)	Indonesian governance guidelines	5 main pillars include Shareholders rights & ownership functions, equal treatment of shareholders, board of directors' responsibilities, transparency & disclosure and stakeholders' role in governance.	N	-	1st stage: questionnaire 2nd stage: G documentations 3rd stage: written explanation	Listed Indonesian companies
S&P'S & Institute for CG (Hawamah), 2011	Environment, Social and Governance (ESG) Index	governance rules for the middle east and south Africa	7 provisions covered shareholders rights, board of directors, disclosure & transparency, auditing/internal control, ownership concentration. work ethics and management system	N	(1-5)	Public information: Websites, newspaper & CSR fillings	150 listed companies in 11 Arab and African countries
SAGIA, 2014 (Schwab & Sala-i-Martin 2014)	SCGI	International G standards and Saudi governance rules	4 attributes: shareholders rights, board of directors & committees, transparency & disclosure and internal control/risk management	equal weights	(0-100 %)	Public information	Listed companies in Tadawul stock exchange

UK IOD & CQI, Cass business school, 2016	Good GI	UK code + corporation law, 2006	5 attributes covered shareholders rights, boards of directors, auditing, compensation and relations with stakeholders.	different weights from stakeholders' views	(0-100 %)	Survey	Large100 listed firms in London stock exchange
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* N= Non-disclosure available

Such questions are the reference point of the proposed typology on building a valid corporate governance index, this study differs from the previous, as it takes into account the countries individualization and the proper measurement theory to offer a valid index from the perspective of both academics and practitioners.

3. Theoretical Framework for CGI Construction

As mentioned earlier, there is a theoretical gap in different stages of the index construction; among the components, the weights, technique and rationale. These gaps sustain using different methodologies for different stages to building a valid CGI from the academics and practitioners' perspectives. Despite the fact that costs and benefits of variability in constructing methodologies, be affected by the model's objectives and scope, the degree of embracing stakeholders' perspectives (arguments, prerequisites & aids) and a collaborative between practical experience and theoretical background (Nerantzidis, 2016, p.301).

As of the practical insights of the literature, the main targeted groups of rating service were investors and bondholders (Donker & Zahir, 2008, p. 91-92), meanwhile, the benefits would be varying significantly by a wide range of users where the governance value added is already in place for different users (Arndt & Oman, 2006, p. 46, 92; Baldacchino et al., 2015, p. 53; IFC, 2014, P. 64, 92-93, Kusi et al., 2018, p.271).

To realize the rule of "different benefits for different users", the logic behind setting out our methodology is in action. In another word, all about stakeholders' preferences would carry out in different stages of the construction phase. Thru emphasizing in asking the right question before thinking on the right answer, whereas Quantifying firm's governance performance is not an essence itself, it is a way to measure the evolution of adopting best practices and even set accountability, transparency, integrity deeply rooted in firms, people and countries culture; this enforced End to End processes which focus on the users' perspectives to achieve users' needs and to maintain business potential requirements in the index.

Corporate Governance Index (CGI) Framework- information system view

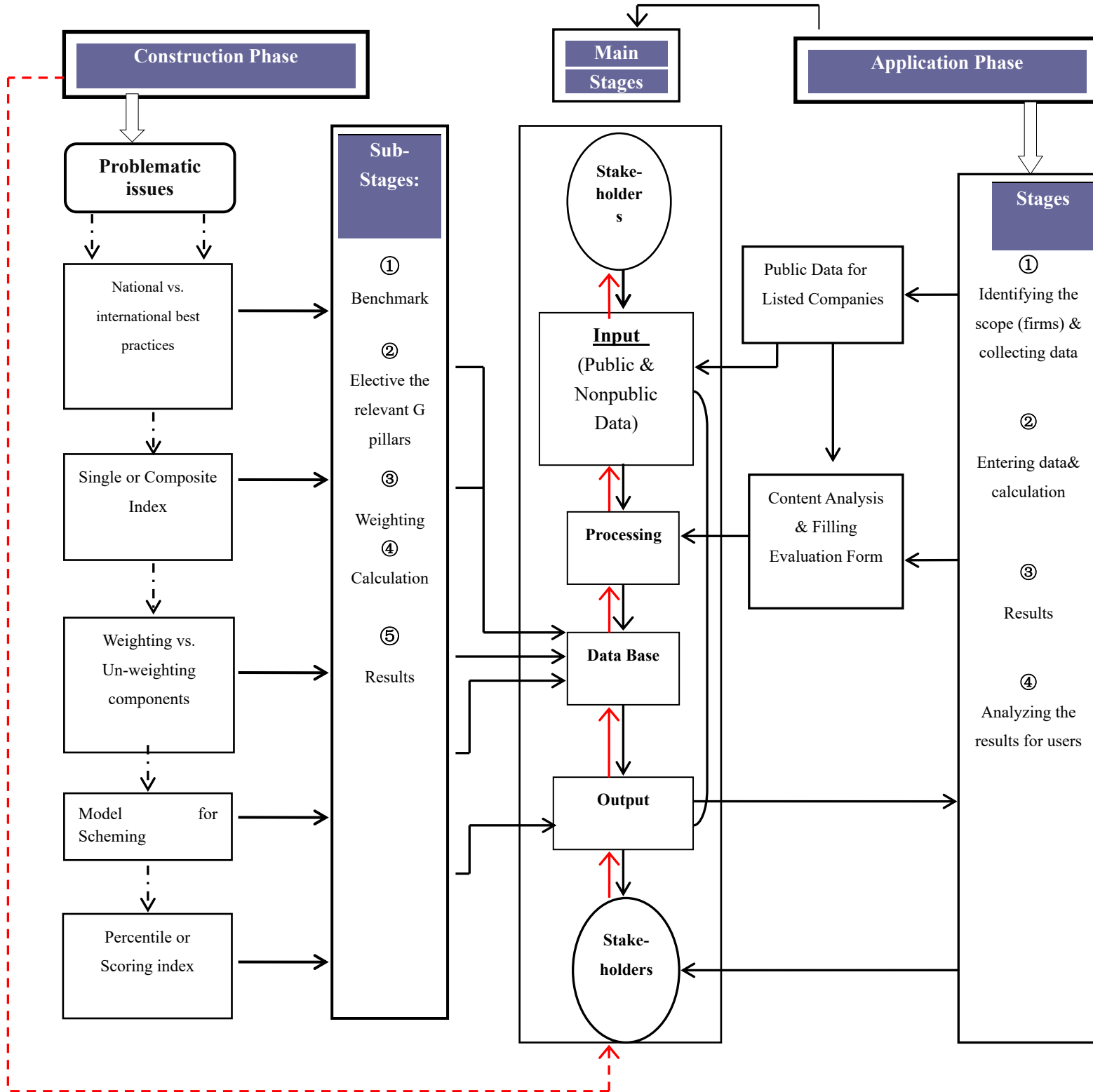


Figure 1. A Conceptual Framework for Building and Conducting CGI

From that point, the suggested methodology would impose the benefits for all stakeholders and use expert methods to achieve transparency, consensus and validity. The recommended typology will be discussed step-by-step from a system view for establishing the main platform of the corporate governance index and identifying the problematic issues related to each step.

Given the information system view, structuring and implication processes of CGI are compulsory three main steps as displayed from the chart (1);

1. Output Design: The End-to-End Process is used to determine the main objectives of the index, rating users, results formats and frequency and accessibility.

2. Database Design: Multi-methodologies had been used:

- Principle Component Analysis (PCA) is used to extract the appropriate components of the index regarding the stakeholders' views (academics and practitioners) to deal with the problem of lacking theory that reasoning builds a composite index.

- Delphi technique is used to assign the relative weights of the main and sub-criteria of the index, using a sample of experts (academics and practitioners) to yield more reliable priorities.

- Statistical methods (stability Analysis) were implemented to measure the degree of stability and consensus in experts' responses among Delphi rounds and to make a decision of carrying out a further round or stop.

3. Processing Design: Electronic Platform was implemented to organize the main inputs of the CGI (governance criterion and weights) automatically, in order to evaluate a large number of companies easily and fast.

3.1 Output Design

Heading for the First stage; i.e., output design, determining the main objectives of the assessment index, outputs' formats, contents, access, frequency, and users are the Preliminary point to develop a governance index (Romney & Steinbart, 2015, p. 680). We expected that the proposed index aims at benchmarking the listed companies in terms of their commitment and characterizing defects area at the firm level, but at the country level, the index anticipated to determine strengths and weakness in governance framework and the reinforce of regulations and monitor activities.

At the international level, moreover, governance compliance is a way to boost external investors' confidence in the legal system, integrity, insolvency and international credit ratings for countries. Matrix 2 indicates the debatable issues relating to design outputs.

Table 2. Determinants of Designing the CGI Outputs

Matrix 2: Determinants of designing the CGI outputs	
Determinants	Question
1. Users	Who?→Users How?→Forms When?→Time What?→Decisions
2. Companies	Which companies can be evaluated, Listed or non/ big or small?
3. Medium	Paper, screen reports, voice, mail or mixed types are used?
4. Format	Which form of output can be presented by; narrative, description, tables or graphs?
5. Location	Where is the location of sending outputs?
6. Access	Who is authorized to access the original data and results?
7. Details	Including details, tables in the final reports or on appendices?
8. Frequency	When and how many times reports are produced?

Based on the first column, there are several determinants given an information system that should be considered in designing the index outputs that starts with identifying the users of outputs. The proposed typology fits the End-to-End process which means that the value starts from stakeholders direct to stakeholders as the end-user of the index outputs, so the stakeholders-orientation is normally the main attitude of the proposed index due to their persuade by the firm's success and/or failure.

The rating output, equally, will be in printed forms published annually for all users. listed firms are incorporated in the assessment process which conducted by specific supervising authority in the first stage to increase objectivity and consistency with the availability of experience and knowledge for external evaluators and then firms can assist in the governance evaluation process for gaining self-assessment experience (IFC, 2014, P. 40).

3.2 Database Design

For the second stage; classified as a database design, two main sources of information are an essential input of construction and application phases; (1) Unrestricted Information: related to corporate governance attributes and variables which determined from both national and international governance structures and firms' actual performance interrelated to such variables, such information is publicly available and the researchers did not struggle to collect them (2) restricted information: associated with the first type of information, which needed join forces to determine them, this type of information is related to the relative importance of governance attributes and criteria for the first phase (Balling et al., 2005, p.7, 20; Hitz & Lehmann, 2015, p.33), and information related to the work effectiveness of governance attributes for the second.

These inputs were derived from the governance benchmark, a distinction between national and international governance codes is the first problematic issue is increasingly recognized and well comprehended in the literature notably in transition economics studies. Whereas

national governance code is dominant for some academic indices, Khanchel (2007); Martynova & Renneboog (2010); Grimminger & Di Benedetta (2013) debated using national governance code absolutely as a guide of firms' governance practices due to the fact that powers and weaknesses of the benchmark will be duplicated in the index, also emerging countries' national governance codes are usually left outdated with respect to rapid changes in the market and users' needs which might less index reliability over time (Khanchel, 2007, p. 743; Martynova & Renneboog, 2010, p. 2-3; Grimminger & Di Benedetta, 2013, p.21 Baldacchino et al., 2015, p.47).

Yet, revising the national governance structure would certainly necessitate index adjustment, this represents an opportunity cost of using insufficient governance benchmark, the instructors should go beyond this by maintaining a high level of flexibility via incorporating international best practices as well to meet the acceptable level of convergence in the index results with other indices and increase the comparability among companies in different countries (Brown & Caylor, 2006, p.412, Martynova & Renneboog, 2010, p.8). approving with these views to measure the progress of listed firms in adopting good practices and variance of implementation, the researchers incorporated three main benchmarks of the CGI; first, Egyptian governance code revised August 2016; second, OECD principle revised 2015 and finally, ISAR best practices of disclosure in 2005 to match the global requirements in firms' governance systems.

A composite or single index is a second challenge noted by the scholars' quantitative governance studies. Selecting the governance pillars and variables that should be built in the index is a subjective process affected by the developer's judgment and not at ease because of the lacking theory which guides the selection (Balling, 2005, p. 5; Schnyder, 2012, p. 9). Mostafa (2012) states that the electing index component is one of the main challenges of the construction phase, as missing important variables would lead to bias in the results of the index.

Simplistic composition of the single-criterion index is a majority of American governance studies which characterized by shareholders' activism and anti-takeover defense as a way to avoid measurement errors subsequent from selecting irrelevant components and assigning weights for various components (Bhagat et al., 2008, p.1832-1833; Schnyder, 2012, p.2). Even though less complexity in one-dimensional indices have increased the predictive value of the results and reduce the measurement subjectivity, it would mislead index construct validity and measurement objectivity because of unavoidable interrelationships among governance provision; board of directors for example associated with the audit committee, internal and external auditing, and selecting one of these mechanisms as a single dimension of the governance index will be depending on using the others (Donker & Zhair, 2008, p.90-91).

Meanwhile, composite governance indices are the main attitude of large numbers of professional and academic indices (S&P's, 2000; Klapper & Love, 2002; Drobetz et al., 2004; Beiner et al., 2006; Price et al., 2011), but it must sustain efforts to select the appropriate measures to overcome one source of measurement errors which related to involving irrelevant

governance attributes or including all governance benchmark variables in the index. Such a phenomenon named by Schnyder (2012) as “a kitchen sink problem”, G-index produced by Gompers et al. (1995) let fall in "the kitchen sink problem" through using all IRRC governance variables (24 variables) in one index. Cremers & Nair (2005), Bebchuk et al. (2008) rebuilding G-index mainly focus on the important measures managing by practical insights; they digest 24 variables into 3 and 6 variables.

3.2.1 Exploratory Factor Analysis and Content Validity

Combining between scientific and practical background to approach the stakeholder perspectives; is the researchers' way to overcome the lacking theory in selecting the relevant attributes through using Exploratory Factor Analysis (EFA) to convey stakeholders' outlook of the governance principles and the variables that should be built in the index specifically. EFA as a discipline tool to condense related and classified data (Hooper, 2012, p.2); used in little numbers of governance literature (Larcker et al., 2007, Ammann et al., 2009, Holm et al., 2014) to reduce governance variables (Larcker et al., 2007, p.973, Amman et al., 2009, p.45); extract the main pillars of governance (Factors) and Mapping out variables with its correlated pillars.

Principle Component Analysis (PCA) is an EFA widely held tool to achieve the previous goals because of the emphasis on the relationships among governance attributes through screening the loading factor for all variables under each factor (attributes) which ensures induplicate variables that would measure the same features (Balling et al., 2005, p.22). EFA is applied given the following determinants (Anderson, 1974, p. 83; Abdi & Williams, 2010, p. 434; Rahn, 2017): First; rotate variables using Varimax converged in 50 iterations. Second: Loading Factor ≥ 0.50 as a rule of variables deletion regardless of sample size; i.e., 120 observations use factor loadings .50 (see Hair et al., 2006, p. Field, 2005); to improve the interpretation of PCA, as a measure of the relation between extracted factors and variables explained by commonalities.

3.2.2 Modified Delphi Technique and Stability Analysis

Another increasing debate is how to model a composite index in terms of the relative importance of its components, where there is no convenient approach to weight different variables (Donker & Zahir, 2008, p.91). An intensive review of the quantitative governance literature by Nerantzidis (2018) stated that 34 studies from 39 followed a dichotomous approach to weight the governance indicators with aim of mitigating subjectivity in personal judgments, enhance transparency and ease of interpretation (Shabbir & Badgett, 2005, p.10; Beiner et al., 2006, p.258; Haldar & Rao, 2013; p.17, Tariq & Abbas, 2013, p.567; Black et al., 2017, p.400)

But relevancy loss derived from weighting inconsistent components equally is the logic behind assigning different weights (Florou & Galarniotis, 2007, p.984). The relative importance of governance attributes is not identical for countries, companies and stakeholders over periods (Larker et al., 2007, Gherghina et al., 2014, p. 243), such as related party transaction is more important for Enron case (Donker & Zhair, 2008, p.91), nevertheless

nominating and compensating committees are dominant in Carillion case.

Commercial and institutional agencies had realized that the costs of using equal weighting assumption outweigh its benefits, definitely these institutions dealing directly with investors and decision-makers; it will lose their clients if the governance evaluation comes with negative impact than users' expectations, hence governance evaluating strategy in action is relatively based on assigning different weights for different components (Nerantzidis, 2016, p.301). Expertise and mathematical capability are the rating agencies' tools to make valid and reliable weights (Bhagat et al., 2008, p.1826) and regard as a key reason to explain the wide gap between practitioners and scholars in governance indices as well as lacking theoretical perspective pertaining to verify the relative weights of governance criterion (Larcker et al., 2007, p.965).

In proportion to practical and little academic mindset, the proposed corporate governance index should reveal the importance of its components, which characterized by market attitude toward governance and the progress in adopting governance rules (Daines et al., 2009, p.9), to outline an additive CGI and avoid "tick and sum problem" resulting from simply summing up incompatible measures without reasoning of using equal weights (Strenger, 2004, p. 13, Florou & Galarniotis, 2007, p. 984, Schnyder, 2012, p. 9); Through conducting modified Delphi Technique.

Delphi Technique is a consensus method conducted in numbers of rounds to converge specialists' views on a specific area and reaching to approval and satisfactory results in case of lacking theory reasoning selection and classification variables (Hill, 1982, Landeta, 2006, Skulmoski et al., 2007, Nerantzidis, 2016). Delphi technique is maintaining participants' anonymity, reduce subjectivity through conducting at least 3 rounds and give opportunities to modify opinions and recognize errors earlier at the end of each one (Gordon, 1994, p.10; Keeney et al., 2001, p. 197; Nworie, 2011, p.28). Further getting the benefits from the modification of the Delphi technique; by utilizing the new technology in Delphi sessions as, sending the Delphi questionnaire via E-mail. The below diagram indicates the determinants and steps had done in Delphi rounds:

As mentioned in Chart (2), The focal point of the Delphi technique, from the above diagram, is selecting the Delphi teamwork which should have the relevant knowledge and ability in governance issues, such as auditors (Cheung et al., 2011), board members (Daines et al., 2009), audit committee members, investors, financial analysts, academics and stock exchange staff (Tsipouri & Xanthakis, 2004, p.19). Three iterations; as stated by Brooks (1979) are sufficient to reach to consensus in participants' views toward a specific questionnaire, and this depends mainly on the degree of stability among responses.

The degree of stability measured statistically to decide on carrying out a further round or not by calculating the coefficient of variation (CV) between R1 and R2 and between R2 and R3- which calculated as a ratio of the relation between standard deviation and mean or the average of results for both rounds - and F-test through measure the variance between R1 and R2 (Shan & Kalaian, 2009, p.228; Nerantzidis, 2016, p.). The stability achieved when the absolute value of the variation in CV for R2 and R1 gets to a small value and CV R2 should

be smaller than in R1 on the first side, and when the value of F-ratio is smaller than or equal on the other side (Shan & Kalaian, 2009, p.228).

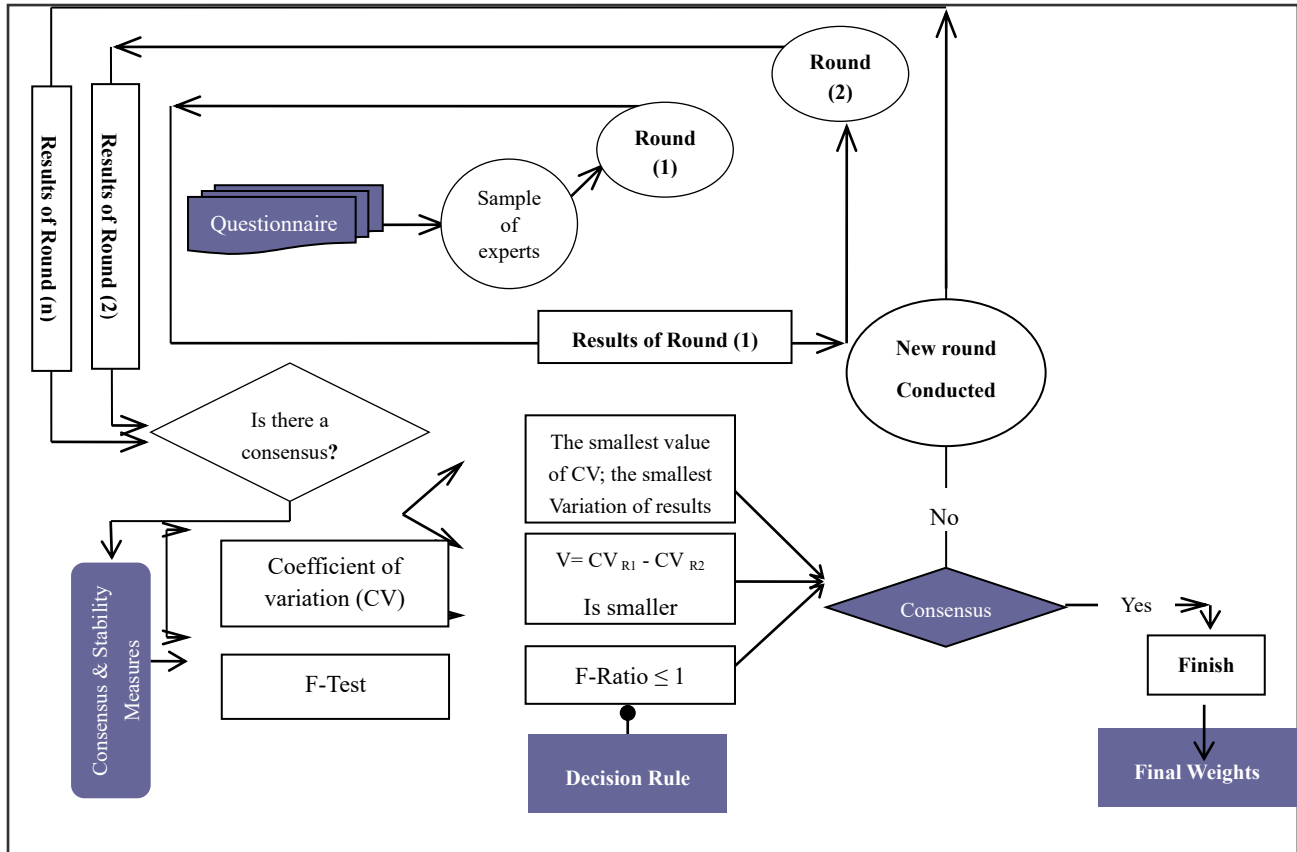


Figure 2. Terms and Conditions of Delphi Technique and Decision Rule of Consensus

3.3 Processing Design - Scheming Platform and Calculation Process

Last but not least, structuring the main inputs of the CGI to calculate the results is the last dilemma of the construction phase; IFC has distinguished three types of Scheming Platforms that could be used to manage the data set of the governance assessment: Paper-Based Platform (Text documents); Electronic-Based Platform: in such type, governance criterion and weights are organized automatically using spreadsheets or web-based applications. (IFC, 2014, P. 29-32)

On the way to choose the best platform of valid corporate governance index, clarifies the costs and benefits of paper and electronic platforms are the main triggers to take such decision; however, text documents are simple and easy to use, Commercial CG Rating depends primarily on Technology (Donker & Zhair, 2008, p.88, Hitz & Lehmann, 2015, p.7). Web-based applications, alternatively, are suite to evaluate broad companies in various regions automatically and easiest, but spreadsheets are available, commonly used and inexpensive compare to Web-based applications; so, spreadsheets are ideal for structuring

and calculating the index results.

On the other hand, CGI is modelling to calculate governance degree of commitment at the firm level by the following formula:

$$CGI_{K,t} = \sum_{j=1}^n \left(\sum_{i=1}^m \frac{x_{ij,k}}{M_j} * W_j \right) * 100 \quad (1)$$

Where $j = (1, 2...n, 5)$

$i = (1, 2,...m, 36)$

Subject to:

$$\sum_{i=1}^m W_j = 1$$

Where;

- $CGI_{k,t}$ - is the value of a corporate governance index for the company (k) in period (t), ranging from (0 to 100%), where 100% is the best level of commitment and zero is the worst.
- X_{ij} - represents the actual score of measure (i) under the main pillar (j) weighted by the relative importance of pillar (j).
- M_j - is the sum of the greatest value which can be assigned to attribute j for all index pillars where ($j=1...n, 5$), and can be calculated via multiplication of greatest score per measure by the number of measures under each provision.
- W_j - is the assigned weight for the main pillars (j).

Companies are ranked based upon their rating into four groups; each group has a specific color referring to the level of compliance and enhancing the comparability among companies; as shown from the below-ranking line:

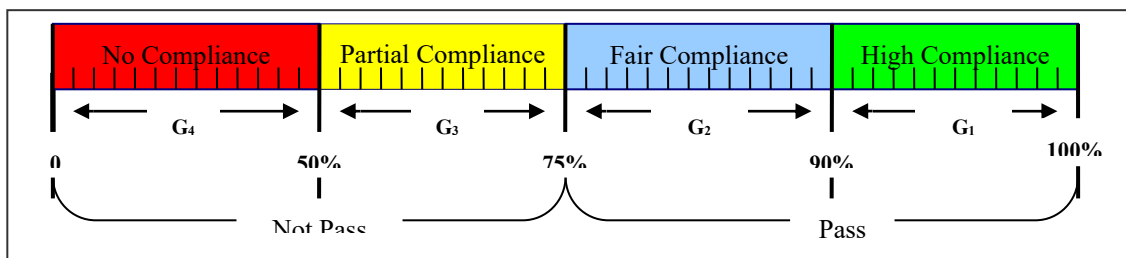


Figure 3. Categorization of Companies in Terms of Their G Ratings

Companies with a compliance rate, $\geq 75\%$ can be classified into two passed groups with two main colors. Green colour means that the company's commitment is in the secure zone; i.e., compliance rate $\geq 90\%$, and blue colour for $75\% \leq$ commitment rate $< 90\%$; referring those companies are fair and still needed more effort to improve their situation. Nevertheless, Commitment rate $< 75\%$ is grouping into a non-passed group with two colours; yellow colour -the area of $50\% \leq$ commitment rate $< 75\%$ - means that the company partially adopts the best practices of good governance and management should direct their attention toward governance practices.

Red colour - $0\% \leq$ commitment rate $< 50\%$ - indicates that companies are located in a risky area and need to change management attitude regarding the firm's governance structure and performance. At the industry level, the proposed index uses the following equation to discriminate business sectors in terms of their commitment rates:

$$ACGI_I = \frac{\sum_{K=1}^L ECGI_K}{\sum_{K=1}^L K} \quad (2)$$

Where;

- ACGII - is the average of the corporate governance index for companies belongs to each industry, ranging from (0 to 100%), where 100% is the best level of commitment and zero is the worst.

- K - Signifies as the total number of companies for each industry, K ranges from 1..., k.

Once an operational structure of the index has been formed, it should be tested on a sample of listed companies. Beyond simple summing up existence and non-existence criteria; the actual governance performance is determined through yearly Evaluation form filings by the non-executive Board members of the targeted sample. Firms' governance practices according to the evaluation form are scored from 0 to 10; where score 10 refers that governance, measures work effectively and 0 means it is not in action.

4. Application Phase

This section provides the application of the PCA, Delphi technique and the consensus statistical methods separately. Finally, the main results of the applicability of the proposed index are outlined versus the other common approach.

4.1 Application of PCA

Matrix 3 and Chart 4 indicate that 12 factors are extracted from applying PCA on 60 governance variables across a sample of stakeholders; which meet the Kaiser rule. These factors are mainly clarifying 51.5% of governance practices quality.

Table 3. Factors Extracted from PCA & Total Variance Explained

Matrix 3: Factors extracted from PCA & total variance explained		
Factors	% of Variance	Cumulative %
Factor 1	5.843	6.857
Factor 2	5.405	12.649
Factor 3	5.274	17.64
Factor 4	4.671	22.122
Factor 5	4.543	26.292
Factor 6	4.439	29.975
Factor 7	4.422	33.37
Factor 8	3.897	36.498
Factor 9	3.756	39.601
Factor 10	3.478	42.663
Factor 11	3.353	48.588
Factor 12	3.121	51.519

As concluded, from the total of 60 governance variables, only 36 have been extracted for the composite CGI. And through mapping of extracted factors to benchmarked governance attributes (Chart 4); the researchers could name the main and minor pillars of the proposed index. As a lack of theory to rationalize the appropriate content of the governance index; the governance regulations have been used to plot the results of exploratory factor analysis for validates the content of the proposed index. As mentioned from Chart (4); the 12 extracted factors are realized five main pillars of benchmarked governance dimensions, which regards board committee construction and functions, companies' procedures conducted to monitor work performance and risk management, the role of internal and external auditing in governing companies, the policy of information disclosure, and finally Board of directors' responsibilities and independence.

Matrix (4) illustrates the selected pillars and measures of the PCA-based governance index. More specifically, there are five main attributes for the CGI; Board Committees, Disclosure & transparency (T&D), Firm Policy & System, Auditing and Internal Control (Auditing & IC.) and Board of directors (BOD):

- Board of directors, this section provides a general discussion of the board of directors in 4 subsections include board independence; board structure; and areas of explicit board responsibility; board and director evaluation; and director training.
- Board Committee: this attribute includes the general rules of construction and responsibilities of Audit, governance and remuneration committees. The responsibilities of the audit committee, governance, and remuneration committees are tested separately via 12 variables that cover relevance for the reliability of financial reporting, governance compliance, compensation policy, risk assessment, internal controls and firms' policies.
- Disclosure & transparency: in recent years Requirements for transparency have increased substantially, so the index measures the degree of transparency and disclosure in financial reports and firms' policy relating to disclosure using 5 measures.
- Firm Policy & System: this section will characterize the general rules of firms' procedures through 8 measures that cover shareholder rights, Equality of disclosure and takeover

defenses compared with general national and industry practice and risk management functions.

- Auditing and Internal Control: the quality of internal control systems, the scope of the audit and non-audit services and auditor's rotation are discussed under this attribute, through 6 measures.

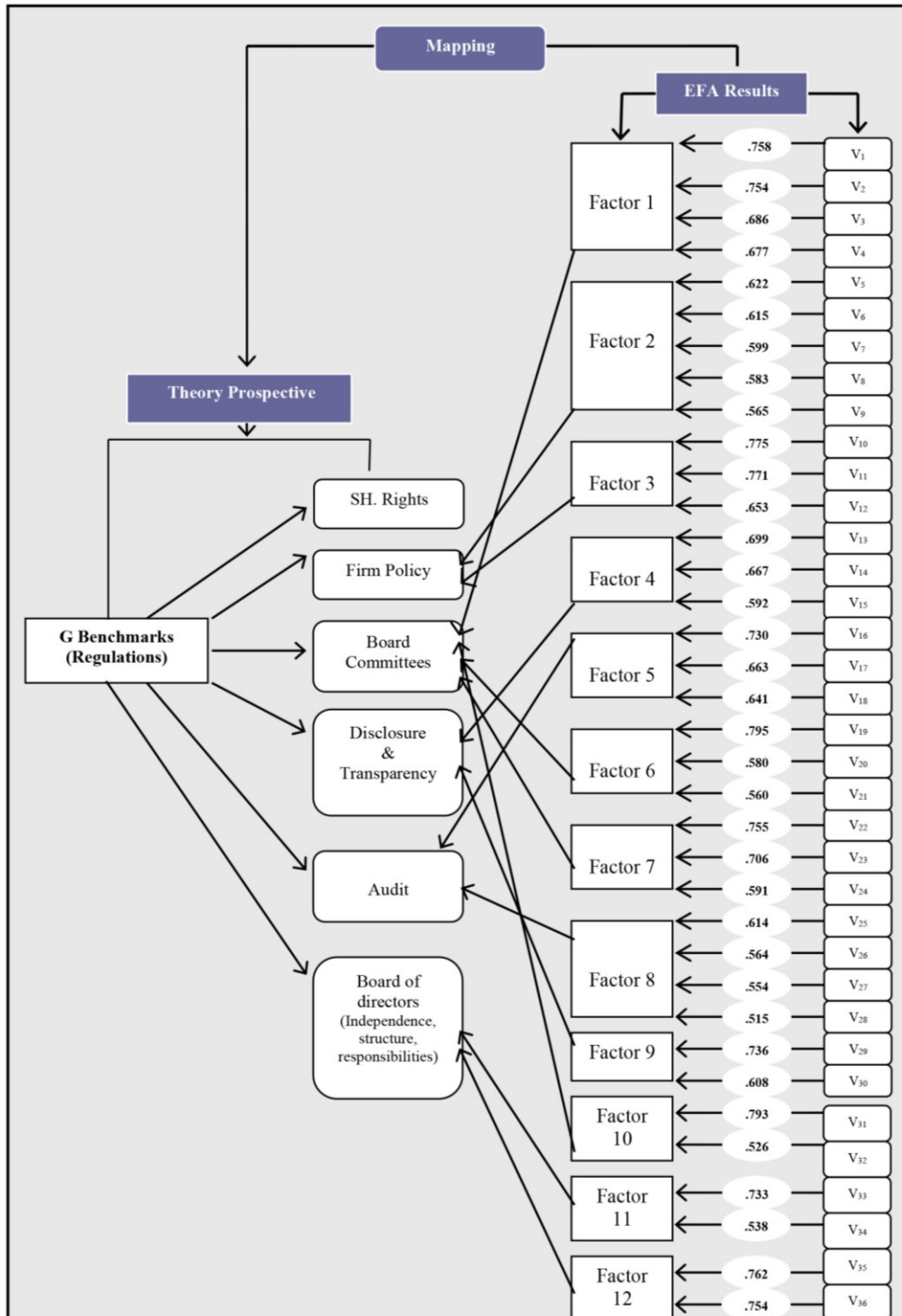


Figure 4. Mapping of Extracted Factors to Benchmarked Governance Attributes

Table 4. EFA-Based Governance Index Components

Matrix 4: EFA-Based Governance Index Components			
Governance Pillars		Practical Measures	
Minor	Main		
(1) Board Committees	The general policy of board committees	1. Board committees comprise of at least three non- executive board members 2. Board committee meetings comprised of at least three months and would be correct at 50% of attendance or minimum level of construction 3. Board of directors confirm the composition and responsibilities of the board committee 4. Board should be comprised of a majority of non- executive and expertise in company's activities	
	Audit committee responsibilities	5. Approved the decision of auditor appointment, and reviewing the audit plan, auditor's recommendations and firm responses. 6. Approved the decision of selection, dismissal and financial terms of the head of internal control and internal audit. 7. Overseeing financial statements & accounting policies before reporting to the board.	
	Governance Committee Functions	8. Supervising firm's governance structure and preparing a report on firm compliance with G Code. 9. Reviewing annual reports and board reports in terms of governance issues. 10. Disclosing on material risks and exist actions to fight them.	
	Remuneration committee functions	11. Compensating of board committee members and large executives depending on performance standards and confirms no conflicts with firms' policies. 12. Reviewing Disclosure relates to the benefits and compensations policy of the board, committee members and large executives during the year.	
	(2) Firm Policy & System	General rules	13. Listed companies should disclose their board committee composition and the balance between executives and non-executives.
			14. Acquisitions of shares by firms' directors or employees must be disclosed and organized by firm rules.
			15. Shareholders have the rights to access, vote and participate in general assembly by post or proxy.
			16. Equality of disclosure to maintain minority shareholders rights.
			17. Disclosure on related party transactions with internal and external parties.
	Functioning of risk Management	18. Assessing the acceptable level of risks and establish proxies to measure risks. 19. Analyzing, assessing and reporting the firm risks 20. Reviewing the reports of activity risks and tacking actions before reporting on the board.	
(3) Transparency & Disclosure (T&D)	The general policy of disclosure	21. Annual reports should include financial and non-financial information 22. Disclosed information should have good characteristics of information quality; transparency, completeness, comparability, timeliness. 23. Firms' websites should be stimulating and updating regularly.	
	D. items	24. Disclosure on Equity Structure including voting rights. 25. Disclosure of accounting estimates and policies.	
	(4)	26. Functional reporting to the audit committee or board directly and administrative reporting to the Chief Executive Officer (CEO).	

Audit & Internal Control (Auditing & IC)	Internal Audit	27. Ensuring the firm's conducting a code of ethics, rules and policies.
		28. Evaluating and reporting to the audit committee on the effectiveness of internal control.
		29. Auditors rotating after 5 years and do not reappoint before 3 years
	External audit	30. General assembly is appointing an external auditor or more depends upon the approval of the board and audit committee.
		31. Audit committee should be approved the non-audit services provided by the firm's auditor to maintain the auditor's independence. And non-audit fees should be balanced with audit fees.
		32. CEO duality is not supported, if not a firm should disclose in annual reports and websites.
(5) Board of Directors (BOD)	Board functions	33. Training of board members and employees including corporate governance culture.
		34. General oversight on information disclosure to maintain the integrity of annual reports.
	Board independence	35. Board comprises at least two independent members with experience.
		36. Board independence should be maintained through disclosing direct/indirect interests in the company.

4.2 Application of Delphi Technique

Table 5. Sample Size of Delphi Rounds

Matrix 5: Sample size of Delphi rounds					
Delphi teamwork proficiency themes			%	N	
Experience	Years	15 ≥ years ≤ 20	3	.3	
		21 - 30	2	.2	
		≥ 30	5	.5	
		Sum	10	1	
	Field	Board members		4	
		Audit committee members		5	
		members			
		Auditors		5	
		Academics		9	
		Stock exchange expert		2	
Qualifications	Academic	PhD.	8		
	Professional	CMA, CIA, others	4		
Major	Accounting and Auditing		8	.8	
	Management		2	.2	
	Sum		10	1	

Matrix 5 indicates the experts' sample of Delphi rounds; 10 experts have involved in Delphi rounds; lasted from February to May 2018. Based on some proficiency themes; we select the Delphi teamwork. For instance, the examiner should have at least 15 years of experience in governance for academic and non-academic. And relating to qualifications, an academic should hold a PhD in the CG or management, practitioners should hold relevant professional certificates.

From the total number of Delphi sample; academics, board members, audit committee members, auditors, and Stock Exchange Expert, 50% of Delphi teamwork has more than 30 years of experience in governance and auditing and 80% of the team works in accounting and auditing major while 20% in management. On the other hand, 80% of the team holds a PhD degree and 30% has professional certificates.

The researchers found that almost the degree of consensus in experts' views was obtained at the end of round three. In round one, all participants put their opinion and expectations about the importance of governance pillars individually based mainly on their awareness and proficiency through sustaining the anonymity of all participants. Matrix 6 shows the results of iteration one of the Delphi technique:

Table 6. Results of Delphi Round One (R₁) %

Matrix 6: Results of Delphi Round One (R₁) %

Governance Main Pillars	Expert (1)	Expert (2)	Expert (3)	Expert (4)	Expert (5)	Expert (6)	Expert (7)	Expert (8)	Expert (9)	Expert (10)
1. Board Committees	10	15	5	10	20	10	10	10	20	10
2. Firm Policy	20	20	25	25	30	30	20	20	20	20
3. T&D	30	25	40	25	30	25	30	25	20	10
4. Auditing & IC.	20	15	15	15	10	15	10	20	20	40
5. BOD	20	25	15	25	10	20	30	25	20	20
SUM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

As a result of round 1 (R₁), Disclosure & Transparency has the highest priority among the components of the index followed by firms' policy and Board of directors, almost 26%, 23%, 21% respectively. Nevertheless, Board committees have the lowest priority almost 12%. These results have been organized to view all the experts' views with a veil of the character of participants, forgetting; an opportunity to revise and adjust their perceptions in terms of other expertise in round two. The below table mentions the results of the second iteration of Delphi rounds:

Table 7. Results of Delphi Round Two (R₂) %

Matrix 7: Results of Delphi Round Two (R ₂) %										
Governance Main Pillars	Expert (1)	Expert (2)	Expert (3)	Expert (4)	Expert (5)	Expert (6)	Expert (7)	Expert (8)	Expert (9)	Expert (10)
1. Board Committees	10	20	10	15	5	10	15	10	10	10
2. Firm Policy	20	20	25	25	25	25	25	30	20	20
3. D & T	25	20	25	10	30	30	30	30	20	20
4. Auditing & IC.	20	15	15	10	10	20	10	10	20	30
5. BOD	25	25	25	40	30	15	20	20	30	20
SUM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

As a result of round 2 (R₂), the priorities have changed significantly from R₁, for example, the first priority is assigned for the board of directors by 25% and the second and third priority assigned for Disclosure & Transparency and firms' policy by 24%, 23.5% respectively. Given that differences, the researchers should conduct the Stability Analysis in order to measure the degree of consensus in Delphi responses in R₂ compared to R₁, which discussed in the next section.

4.3 Application of Stability Analysis

The CV and F-ratio analysis were conducted to measure the degree of consensus in opinions of the Delphi teamwork. Matrix 7 indicates that CV was decreased for all governance pillars except the last one (Board of Directors); ever since, the CV for board committees; firm policy; disclosure & transparency and auditing & Internal Control in round one was 40%, 18%, 29%, 47% respectively, compared to 35%, 14%, 21%, 41% in round two. Nevertheless; CV was increased from 27% to 28% for the board of directors. So, a third-round would trigger to match the consensus and stability rule.

Table 8. Stability and Consensus Tests Results for (R₁) & (R₂)

Matrix 8: Stability and Consensus Tests Results for (R ₁) & (R ₂)						
Statistic		Board Committees	Firm Policy	T& D	Auditing & IC.	BOD
Mean	(R ₁)	12	23	26	18	21
	(R ₂)	11.5	23.5	24	16	25
Std. Deviation	(σ; R ₁)	4.83	4.216	7.746	8.563	5.676
	(σ; R ₂)	4.116	3.375	6.583	6.583	7.071
Variance	(σ ² ; R ₁)	23.333	17.778	60	73.333	32.222
	(σ ² ; R ₂)	16.944	11.389	43.333	43.333	50
CV	R ₁	0.4025	0.1833	0.2979	0.4757	0.2702
	R ₂	0.3579	0.1436	0.2742	0.4114	0.2828
V = CV _{R1} - CV _{R2}		0.04458	0.0396	0.0236	0.0642	-0.0125
F-Ratio		0.7261	0.6406	0.7222	0.5909	1.5517

On the other hand, F-Ratio proves the results of CV measure, since F- Ratios for all governance pillars were less than one except the last pillar; which had a ratio greater than one and this was confirmed the validity of further Delphi round for altering team judgments. The

following matrix indicates third round assessments and final weights calculated as an average of ten experts' views:

Table 9. Results of Delphi Round Three (R₃) %

Matrix 9: Results of Delphi Round Three (R ₃) %										
Governance Main Pillars	Expert (1)	Expert (2)	Expert (3)	Expert (4)	Expert (5)	Expert (6)	Expert (7)	Expert (8)	Expert (9)	Expert (10)
1. Board Committees	10	15	10	10	10	15	10	10	10	10
2. Firm Policy	20	20	25	25	25	25	25	20	25	20
3. T&D	25	25	25	30	30	30	30	20	25	20
4. Auditing & IC.	20	15	15	10	20	10	10	20	15	30
5. BOD	25	25	25	25	15	20	25	30	25	20
SUM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

As mentioned earlier, the decision of ending the Delphi process needs statistical tests to measure the extent of stability among the experts' views; so, CV and F-Ratio have been calculated for such purpose. It is seen from table 13 that CV of R₃ was smaller for all governance attributes than in R₂; because the CV for board committees; firm policy; disclosure & transparency; auditing & Internal Control and Board of Directors in round three were 19%, 11%, 15%, 37%, and 17% respectively, compared to 35%, 14%, 21%, 41% and 28% in round two. Moreover, the variations (V) between R₃ and R₂ were shifted than between R₂ and R₁. Conversely, F-Ratio for all attributes was less than 1 as seen; which means that stability in experts' perceptions have been attained for all pillars in round three and that was the end of Delphi iterations.

Table 10. Stability and Consensus Tests Results for (R₃) %

Matrix 10: Stability and Consensus tests results for (R ₃) %					
Statistic	Board Committees	Firm Policy	T&D	Auditing & IC.	BOD
Mean (R ₃)	11	23	26	16.5	23.5
Std. Deviation	2.108	2.582	3.944	6.258	4.116
Variance (R ₃)	4.444	6.667	15.556	39.167	16.944
CV (R ₃)	0.1916	0.1122	0.1516	0.3792	0.1751
V= CV _{R2} - CV _{R3}	0.1663	0.0314	0.1226	0.0322	0.1077
F -Ratio	0.0113	0.0098	0.0034	0.0087	0.0035

Accordingly, the researchers concluded that disclosure and transparency; board of directors (functions and independence) and firm policy (risk management and general rules) are the main priority of governance criterion by 26%, 23.5%, and 23% respectively and sampled experts had reasoned the prioritization of such pillars by the importance of conducting the code of ethics and internal control mechanisms to support transparency, shareholders rights

and company reputation to achieve stakeholders satisfaction.

4.4 The Applicability of the Proposed Index

Once an operational structure of the index has been formed, it should be tested on a sample of listed companies. Beyond simple summing up existence and non-existence corporate governance criteria; the actual governance performance of tested firms is determined through yearly Evaluation form filings by the non-executive Board of directors' members of the targeted sample. Firms' governance practices according to the evaluation form are scored from 0 to 10; where score 10 refers that governance, variables are work effectively and 0 means it is not in action. Collected scores were processed using the index commitment formula (see section 3.3) to investigate the progress of adopting good governance rules in practice, identifying the differences among Companies regarding their sensitivity and perceptions of governance guidance, and exploring the role of different industries in boosting the espousal of good governance and ethical issues.

Table (11) presents the CG disclosure ratings calculated for the tested companies based on two main views; weighted attributes (W) and equally weighted attributes (E). The last set of columns shows that the compliance was partially and deviated in all governance attributes. Firm 8 and 9 are the top-ranked companies with a compliance rate of 76% from 100% and followed by firm 7 with a compliance rate equal to 74%. Meanwhile, the progress of adopting best practices is relatively low, but it's ever closest to the World Bank (2009) and the European bank (2017) assessment of such Companies in 2009 and 2017 respectively.

Table 11. Results of Assessing Governance Practices for Tested Companies Using CGI

Matrix 11: Results of Assessing Governance Practices for Tested Companies Using CGI

Weight	G. Pillars	(1)		F (2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		Mean
		W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E	
0.11	Board Committee	0.05	.118	0.06	.126	0.06	.12	0.06	.13	0.06	.13	0.06	.132	0.09	.202	0.09	.192	0.08	.176	0.09	.20	0.07
0.23	Firm Policies	0.11	.076	0.09	.06	0.1	.072	0.1	.07	0.09	.06	0.17	.118	0.1	.066	0.15	.106	0.16	.112	0.15	.103	0.12
0.26	T&D	0.23	.088	0.24	.092	0.23	.09	0.23	.088	0.22	.068	0.22	.084	0.25	.098	0.22	.068	0.18	.07	0.18	.07	0.22
0.17	Auditing and IC.	0.12	.106	0.15	.124	0.11	.094	0.11	.09	0.11	.096	0.11	.092	0.12	.10	0.12	.10	0.14	.116	0.14	.118	0.12
0.24	BOD	0.17	.058	0.15	.052	0.14	.048	0.15	.052	0.17	.058	0.09	.032	0.18	.06	0.18	.06	0.2	.068	0.16	.054	0.16
1	Total Score	223		227		212		215		215		229		263		272		271		273		240
	Averaged Score	0.69		.45		.68		.45		.65		.42		.65		.43		.66		.43		.66
	Ranking	5		6		0		9		7		8		3		2		1		4		

Whereas, the results show that a soaring proportion of compliance was related to Disclosure and Transparency, where 90% of firms are formally committed and they were ranked in group one and group two. While almost half of the firms are inadequately governing their policies and rules compared to the Board of directors (independence & responsibilities) and auditing & internal control provisions.

Evaluating the strengths and weakness in governance practices of tested firms are ensuring that there is an agreement among the three assessment approaches are in some cases, such as, ownership concentration (family corporations) in the majority of tested companies that create a challenge of board independence because of the duality of the head of directors and executive manager position. Besides the lack of disclosure about non-financial information than financial information, such as disclosure on board members and top executives' compensations and salaries and the balance between executives and non-executive members in board composition, also there was no outstanding disclosure about non-audit fees and auditor's rotation.

From another perspective, there is no doubt that industry regulations can approve the steps forward adopting the best practices of sound governance; at the industry level (Figure 5) the Personal and household products sector reaches the highest level of compliance at .766 which classed into the second group and followed with Industrial, goods, and services and automobiles sector classified into the fair area. But, chemicals, food, and beverage industries which supposed to face a wide range of risks and well-organized with environmental and social regulations have partially attained the best practices of governance provisions with a compliance rate equal to .729 and .658 respectively.

As seen from the above results, Firm Policies and Procedures attribute is the least priority in the practice among the tested sample, where all firms were not passed in adopting the firm system guidelines; 50% of corporations are classed in group three and the rest are classified into group four. Despite, disclosure & transparency provision was top-ranked among other provisions; Industrial, goods, service and automobiles and Basic resources sectors were accomplished a high degree of compliance. On the other hand, Construction and materials, Personal and household products and Food and beverage industries were almost committing the requirements of disclosure & transparency in annual reports, governance filings, and websites.

All in all, the governance ratings are sensitive to the applied methodology. Particularly, a well-known approach in quantifying CG, i.e., equally weights, is underestimated the index findings then it will directly affect all aspects of governance endogeneity with firm performance/value this finding is consistent with the findings of Al-Shiab, (2003) and Nerantzidis (2016). For this reason, the researchers recommended that further studies have to carry out to test the impact of weights and equally weights on firms' performance and value for fulfilling the reliability of the index.

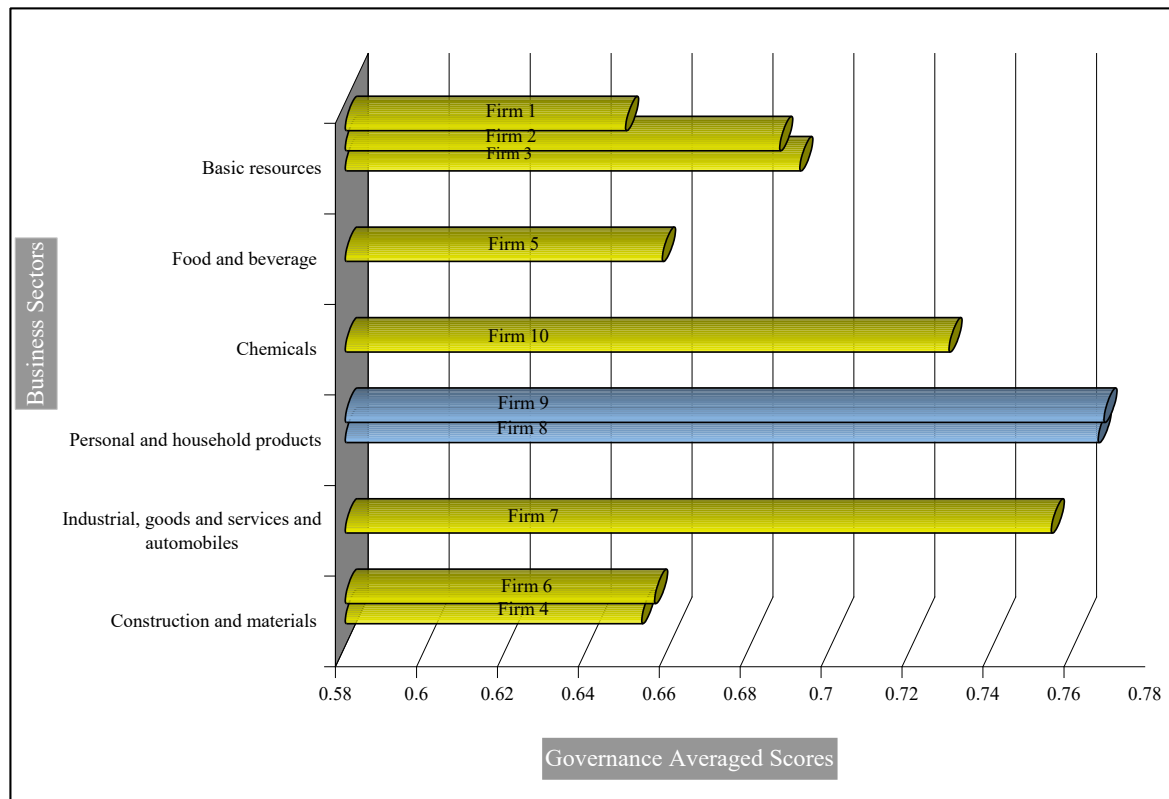


Figure 5. Compliance Rate at the Industry Level

5. Conclusion

The main point of this study is to adopt an information system view, Experts' method and statistical analysis to construct a valid Corporate Governance Index (CGI); it intends to develop a new methodology to overcome the shortcomings in the previous construction methodologies, with a concern of benchmarking listed companies' governance practices with local and international corporate governance guidelines. And ranking the tested companies and analyzing the internal and external triggers of governance compliance on firm and industry level.

Multi-methodologies have been used to develop a reliable quantitative index; (1) reviewing the governance literature for identifying the methodological gap in developing a governance assessment model by academics and institutions. and (2) Information system view is used to build a quantitative index in three main stages; output design from stakeholders' view; database design through using the principal component analysis to extract the relevant index measures and applying the modified Delphi technique for assigning the relative significance of each component; process design by adopting the electronic platform to compute and issue the index results.

The current study empirically concluded that board committees, disclosure and transparency, firm policies and rules, auditing and internal control and board of directors' independence and

responsibilities are the main corners of the governance assessment index divided into 35 sub measures, meanwhile, disclosure and transparency are pivotal in the assessment process which has the heights priority with relative weight equal to 26%.

The findings also suggested that the governance ratings are oversensitive to the quantification methodology. Particularly, an equal weighting approach is underestimated the index results then it will directly affect all aspects of governance endogeneity problems. For this reason, the researchers recommended that further studies have to carry out to test the impact of weights and equally weights on firms' performance and value for fulfilling the reliability of the index.

Furthermore, the researchers recommend that governance is not except for companies' management itself, because the firms' industry can play a fetal role in adopting the best practices of corporate governance by reforms in governance regulations and organizational law. So, the firms' environment should be governed and increasing the awareness about the role of the general assembly, board of directors and stakeholders in monitoring companies by conducting governance workshops regarding board incentives, related party transactions, investors' relations and how to report on the governance practices for each company concerning the "comply or explain" rule.

The practical implications of this paper are important for governance guidelines setters, policymakers, and stakeholders. For the G setters, policymakers, it underlines the necessity to harmonize between industries' regulations and governance code and revise the priority of the "comply or explain" approach in practice. In order to help firms and professional institutions put their action plans for governance enrichment, active participation of all parties and international affordability. For companies, the researchers recommend the importance of enhancing the role of the board of directors' committees, transparency & disclosure on governance practices and explanations for non-compliance in annual reports or governance reports. For CGI users, the research highlights that ratings' users should be more precarious and concerned about the base of the assessing models. Finally, for academics, it boosts their knowledge in terms of methodological issues relating to governance assessment.

On the other hand, the current study has a number of limitations. First, the methods are used in this study; the Delphi technique has some critics, it is possible that a different set of participants would provide different results. Second, the benchmark of the CGI might present a limitation, as the Egyptian G code changes continuously whose affects the reliability of the index. Regarding future research, we think it would be mainly notable to involve more than one Experts' method regarding weights estimations to and enhance the reliability of results of the index; such as the Delphi model compared to the Analytic Hierarchy Process (AHP).

Also, it is important to keep on investigating the governance ratings in a large sample of companies and countries, in particular, those with emerging markets. The inclusion of cross-countries analysis will contribute significantly to the extension of the existing research on the relationship between corporate governance ratings and other firms' aspects such as market, operational or financial performance and firm value. Furthermore, investigating the effects of COVID 19 Pandemic on corporate governance Guidelines and

ratings all over the world.

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APPENDIX 1

Corporate governance attributes and sub-measures as an input of Exploratory Factor Analysis

Corporate Governance Variables	EG. code	OECD	ISAR
Shareholders Rights			
A timetable of general assembly should be well known to the public with enough time and disclosed on the firm's website.	✓	✓	
Shareholders have the rights to access, vote and participate in general assembly by post or proxy.	✓	✓	✓
Equality of disclosure to maintain minority shareholders rights.		✓	✓
Shareholders are incorporated in preparing the agenda of the shareholders meeting.	✓	✓	✓
Cumulative voting vs. majority voting in taking decisions.	✓	✓	
Board of Directors (Responsibilities, Independence, Structure)			
Board comprises at least two independent members with experience.	✓	✓	✓
Board independence should be maintained through disclosing direct or indirect interests in the company.	✓		✓
CEO duality is not supported, if not a firm should disclose in annual reports and websites.	✓	✓	
The board should be comprised of majority of non-executive and expertise in the company's activities.	✓	✓	✓
Training of board members and employees including corporate governance culture.	✓		✓
General oversight on information disclosure to maintain the integrity of annual reports.	✓	✓	
Disclosure on the board of directors nominating period.	✓	✓	
At least one of the minority shareholders are represented in the board of directors.	✓	✓	
Self-evaluation of board and performance of members conducted by the head of directors regularly.	✓	✓	✓
Board meetings can be held using new technology.	✓	✓	
Employees should be incorporated in board composition.	✓	✓	
Shareholders are evaluating the board of directors in terms of its reports.	✓	✓	✓

Board Committees (rules & functions)			
Board committees comprise of at least three non-executive board members	✓	✓	
Board committee meetings comprised of at least three months and would be correct at 50% of attendance or minimum level of construction	✓		
The Board of directors confirm the composition and responsibilities of the board committee	✓	✓	
Audit committee; approved the decision of auditor appointment, and reviewing the audit plan, auditor's recommendations and firm responses.	✓	✓	
Audit committee; approved the decision of selection, dismissal and financial terms of the head of internal control and internal audit.	✓	✓	
Audit committee; Overseeing financial statements & accounting policies before reporting to the board.	✓	✓	
Governance committee; supervising firm's governance structure and preparing a report on firm compliance of G Code.	✓		
Governance committee; reviewing annual reports and board reports in terms of governance issues.	✓		
Compensation committee; compensating of the board, committee members and large executives depending on performance standards and confirms no conflicts with firms policies.	✓		
Compensation committee; Reviewing Disclosure relates to the benefits and compensations policy of the board, committee members and large executives during the year.	✓		
The nominating committee aims at reviewing the requirements of qualifications and skills needed in board members.	✓		
A nominating committee is accountable for the independence of non-executive and independent board members.	✓		
At least one of the audit committee members has financial and accounting expertise.	✓	✓	
Disclosure & Transparency			
Annual reports should include financial and non-financial information	✓	✓	✓
Disclosed information should have good characteristics of information quality; transparency, completeness, comparability, timeliness.	✓	✓	✓
Firms' websites should be stimulating and updating regularly.	✓	✓	✓
Disclosed information should be prepared using generally accepted accounting standards.	✓	✓	
Annual reports have been audited by independent auditors.	✓	✓	
Annual reports are presented in Arabic and English languages.	✓	✓	
Disclosure on Equity Structure including voting rights.	✓	✓	
Disclosure of accounting estimates and policies.	✓	✓	

Listed companies should disclose their board committee composition and the balance between executives and non-executives.	✓	✓	✓
Disclosing on material risks and exist actions to fight them.	✓	✓	
Disclosure on related party transactions	✓	✓	✓
Disclosure on firm compliance of governance guidelines and its approach for such commitment.	✓	✓	
Audit & Internal Control			
Functional reporting to the audit committee or board directly and administrative reporting to the Chief Executive Officer (CEO) to maintain internal audit independence.	✓		✓
Evaluating and reporting to the audit committee on the effectiveness of internal control.	✓		✓
The internal audit assesses the efficiency and the effectiveness of internal control and reporting to the audit committee about the results.	✓		✓
Auditors rotating after 5 years and do not reappointing before 3 years	✓		✓
The general assembly is appointing an external auditor or more depends upon the approval of the board and audit committee.	✓		✓
The audit committee should be approved the non-audit services provided by the firm's auditor to maintain the auditors' independence. And non-audit fees should be balanced with audit fees.	✓		✓
Auditors should realize the standards of proficiency, integrity, independence.	✓		✓
Auditors should due professional care and be independent in their work.	✓		✓
Firm Policies & Procedures			
Ensuring the firm's conducting a code of ethics, rules and policies.	✓		
Acquisitions of shares by firms' directors or employees must be disclosed and organized by firm rules.	✓		
Put general rules of performing and advocating the related party transactions with internal and external parties.	✓		
Assessing the acceptable level of risks and establish proxies to measure risks.	✓		
Analyzing, assessing and reporting the firm risks	✓		
Reviewing the reports of activity risks and tacking actions before reporting on the board.	✓		
Risk management reports to the board of directors, risk committee or audit committee if the risk committee does not exist.	✓		
Management is responsible for establishing effective procedures to attain accountability, responsibility and awareness toward firm values.	✓	✓	
Each Firm ought to have a code of ethics involving organizational values, ethical issues.	✓		✓
Compliance management informs about unethical behaviors to trustworthy parties.	✓		

APPENDIX 2

Content analysis for the tested sample

board committees	scores									
The general policy of board committees	F.1	F.2	F.3	F.4	F.5	F.5	F.7	F.8	F.9	F.10
1. Board committees comprise of at least three non-executive board members	1	1	1	1	1	1	1	1	1	1
2. Board committee meetings comprised of at least three months and would be correct at 50% of attendance or minimum level of construction	1	1	1	1	1	1	1	1	1	1
3. Board of directors confirm the composition and responsibilities of the board committee	1	1	0	0	0	1	0	1	1	0
4. Board should be comprised of the majority of non-executive and expertise in the company's activities	1	1	0	0	0	1	0	0	1	0
Audit committee responsibilities										
5. Approved the decision of auditor appointment, and reviewing the audit plan, auditor's recommendations and firm responses.	0	0	0	0	0	0	0	0	0	0
6. Approved the decision of selection, dismissal and financial terms of the head of internal control and internal audit.	0	0	0	0	0	0	0	0	0	0
7. Overseeing financial statements & accounting policies before reporting to the board.	1	1	1	1	1	1	1	0	1	0
Governance Committee Functions										
8. Supervising firm's governance structure and preparing a report on firm compliance with G Code.	0	0	0	0	0	0	0	0	0	0
9. Reviewing annual reports and board reports in terms of governance issues.	0	0	0	0	0	0	0	0	0	0
10. Disclosing on material risks and exist actions to fight them.	0	1	1	1	1	0	1	0	1	0
Remunerations committee functions										
11. Compensating of the board, committee members and large executives depending on performance standards and confirms no conflicts with firms policies.	0	0	0	0	0	0	0	0	1	0
12. Reviewing Disclosure relates benefits and compensations policy of the board, committee members and large executives during the year.	0	0	0	0	0	0	0	0	1	0

APPENDIX 3

Part of Companies' self-evaluation form

board committees	Evaluation scores										
The general policy of board committees											
1. Board committees comprise of at least three non-executive board members	0	1	2	3	4	5	6	7	8	9	10
2. Board committee meetings comprised of at least three months and would be correct at 50% of attendance or minimum level of construction	0	1	2	3	4	5	6	7	8	9	10
3. Board of directors confirm the composition and responsibilities of the board committee	0	1	2	3	4	5	6	7	8	9	10
4. Board should be comprised of the majority of non-executive and expertise in the company's activities	0	1	2	3	4	5	6	7	8	9	10
Audit committee responsibilities											
5. Approved the decision of auditor appointment, and reviewing the audit plan, auditor's recommendations and firm responses.	0	1	2	3	4	5	6	7	8	9	10
6. Approved the decision of selection, dismissal and financial terms of the head of internal control and internal audit.	0	1	2	3	4	5	6	7	8	9	10
7. Overseeing financial statements & accounting policies before reporting to the board.	0	1	2	3	4	5	6	7	8	9	10
Governance Committee Functions											
8. Supervising firm's governance structure and preparing a report on firm compliance with G Code.	0	1	2	3	4	5	6	7	8	9	10
9. Reviewing annual reports and board reports in terms of governance issues.	0	1	2	3	4	5	6	7	8	9	10
10. Disclosing on material risks and exist actions to fight them.	0	1	2	3	4	5	6	7	8	9	10
Remunerations committee functions											
11. Compensating of the board, committee members and large executives depending on performance standards and confirms no conflicts with firms policies.	0	1	2	3	4	5	6	7	8	9	10
12. Reviewing Disclosure relates to the benefits and compensations policy of the board, committee members and large executives during the year.	0	1	2	3	4	5	6	7	8	9	10

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