

Information Technology Governance Implementation and Its Determinants in the Egyptian Market

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Abstract—Effective IT governance guarantees the strategic alignment of IT and business goals, risk mitigation control, and better IT and business performance. This study seeks to examine empirically the extent of IT governance implementation within the firms listed on the Egyptian Stock Exchange (EGX30) and its determinants. Accordingly, 18 semi-structured interviews, face to face, phone, and video-conferencing, using various tools (e.g., WebEx, Zoom, and Microsoft Teams) were undertaken at the interviewees' offices in Egypt between the end of November 2019 and the end of August 2020. Results suggest that there are variances in the extent of IT Governance (ITG) implementation within the firms listed on the EGX30, mainly caused by the industry type and internal and external triggers. The results also suggest that the organization size, the type of auditor, the criticality of the industry, the effective processes & key performance indicators (KPIs), and the information intensity expertise of the chief information officers (CIOs) have a significant impact on ITG implementation within the firms.

Keywords—Effective IT governance, Egyptian Market, information security, risk controls.

I. INTRODUCTION

WITH the increase in the reliance on IT and the associated growth of IT expenditure, the idea of ITG has become an increasingly common and prominent ideal within most organizations to ensure prudent and value-based investment in the technology [1], [2]. ITG consists of structures, processes, and relational mechanisms that work together in harmony to ensure that IT investments and business objectives are aligned [3]. The foundation of ITG is to provide decision-makers an acceptable level of assurance that an organization's strategic objectives are not jeopardized by IT failures [4]. In this respect, the aim of this paper is to critically explore the extent of ITG implementation within the firms listed in the Egyptian Stock Exchange (EGX30) and its determinants. The main objective of this critical exploration is to provide insights about the extent of the implementation of information technology governance within the Egyptian market and various triggers through the employment of a semi-structured interview approach with ITG professionals.

Following this introduction, the paper is structured as follows: theoretical background, then the research method, discussion and results and conclusions.

II. THEORETICAL BACKGROUND

ITG is considered a complex system as it comprises several

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critical aspects, namely, "leadership, organization and decision rights, scalable processes and enabling technologies" [5]. Early conceptualizations of ITG, often considered as a subset of corporate governance [6], [7]. The role of ITG is recognized in ensuring a valuable contribution from the organization's IT to its overall business strategy [8].

ITG has been demanded by many organizations and high-level ITG models are being used within the organizations and rapidly emerging in IT, thus becoming an important subject to consider [9]. So far, some ITG frameworks have been developed to guide and assist ITG implementation.

It is notable that there is a research shift from the technological aspect of IT into the business aspect of IT [10]. This is reflected by extensive research on the governance of IT in multiple countries. Though, most of these countries are developed ones with little research on the developing countries. Hence, the drive for ITG implementation within the developing countries especially Egypt remains mostly unexplored.

III. RESEARCH METHOD

To achieve a comprehensive understanding and better scan the degree of ITG implementation within various companies in the Egyptian market, this study follows [11]. We used qualitative design methodology to answer the research questions: (1) To what extent ITG is implemented in the firms listed in the EGX30? (2) What are the determinants affecting the ITG implementation in the firms listed in EGX30?

A. Sample Selection

This study includes a non-probability random sampling approach as adopted from [12].

Based on the nature of the study, the sample group selected for this study consists of professionals that work in the field of ITG within the firms listed in the Egyptian Stock Exchange (EGX 30). The experience level of this sample varies, ranging from governance subject matter experts (directors) to C-level executives. Additionally, the length of service in the profession and/or industry is varied and ranged from six to 31 years. And there is a mixture of professional expertise and qualifications. Although, age is not a consideration for this research, the sample consisted of professionals between the ages of 30 years to 65 years. Demographics of this sample comprise professionals from the following industries:

- Financials
- Real Estate

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- Chemicals
- Manufacturing
- Healthcare
- Construction
- Communications
- Energy

B. Data Collection

Over a period of 10 months, from end of November 2019 to end of August 2020, a total of 18 interviews were carried out across range of genders, ages, positions, and types of long-term experiences within the Egyptian market over IT directors, managers, and CIOs.

In addition to the primary data collection method used in terms of the semi-structured interviews, other secondary data are also obtained using the annual reports and corporate websites.

C. Reliability and Validity of the Interview

To attain reliability, the study must be able to endure several tests by other researchers and reach the same results [13]. As for the concept of validity, it is concerned with an instrument's ability to answer questions or measure what it says it measures [14].

D. Data Analysis

The recommendations highlighted by [15], in which the methodology of the data analysis of this study, are adopted.

Within this study, 18 interviews are tape recorded along with some observation notes that are taken during the interview. Immediately, following each interview session, the researcher listens to the verbal responses on the recordings, and then transcribes and places the data in Microsoft Word format. Hence, all transcripts are prepared in English, except for only one interview which is translated from Arabic to English and then transcribed.

After the transcripts are completed, a preliminary analysis is taken place to identify some common themes. After all the interviews are complete, the coding phase took place. During this time, the researcher goes through the interview data on several occasions to develop a better understanding of ITG. Moreover, the researcher assigns code (a name to each participant) to ensure anonymity and confidentiality e.g. (A) is for the first interviewee [16]. Afterwards, the researcher reviews each transcript and highlights the most prominent statements and neglects any irrelevant points to the purpose of the research [16].

During the data analysis process, several themes, patterns, and connecting relationships emerged that create a need for additional analysis to find commonality across various data sources. Based on the themes and patterns detected, the data are cross-checked and summarized multiple times to guarantee reliability [14]. The themes are organized based on their frequency and categories. This is followed by the final analysis and the step of writing up (reflective journaling technique). Within the writing up process, each theme is reinforced by a wide range of quotations that are the most prominent and remarkable ones within each theme. The reflective journaling

technique aids the researcher to tackle any unclarified thoughts and perceptions associated with ITG.

IV. RESULTS AND DISCUSSIONS

In their journey to implement and further develop ITG, organizations are confronted with a set of challenges and diverse problems. Accordingly, to further examine the extent of ITG implementation within the companies listed on the EGX 30, we ask our participants across 8 different industries within the Egyptian market regarding their perceptions about ITG implementation in practice as illustrated in Fig. 1. The CIO of a financial services organization opines: "ITG with all its aspects is implemented with clear governance and strict policies for how they run the bank and how they change the bank, financial governance, project delivery governance and risk, information security governance and vendor management governance are also implemented."

Similarly, the IT director of a telecommunication company highlights that ITG is vastly implemented on each aspect within IT whether financial, change management, risk, security, data, project delivery and systems availability governance; as he cites regarding the implementation of systems availability governance aspect: "Due to the sensitivity of the business, ERP Systems (Oracle) are running with a great percentage up to 99.999%."

While the IT directors for the energy and construction companies reveal: "ITG is implemented within the company with a percentage of 75%." The IT directors for healthcare, pharmaceuticals and manufacturing organizations summarize: "ITG is implemented within the company with a percentage of 60%." As for the remaining sectors (real estate and chemicals), according to the interviewees, the extent of ITG implementation is low in comparison to the prior sectors which will be further explained.

It is revealed that there are a lot of discrepancies in the degree of ITG implementation within the companies listed in the Egyptian market, which is mainly caused by the industry type, internal and external triggers (illustrated later). For instance, based on the former answers of the interviewees, it is found that the degree of ITG implementation within the financials and the communications is very high as they are grouped within high tier IT industries (highly IT dependent) in compliance with [17]-[21]. In which the strategic role of IT is transformational one (creating a full entire change within the organization) as cited in [22], and the criticality of their industries.

Surprisingly, it is notable that ITG is implemented to a great extent with its various aspects within the communications company; nonetheless it is deliberated as a publicly listed company. This can be explained to the positive impact that ITG has on the decision making within an organization and the criticality of the industry (in terms of telecom); resulting in improved business operations at the end that agrees with [23], [24].

Moving to the extent of ITG implementation within energy and construction (even though they are critical industries), it is shown that the degree of ITG implementation is above average as they are both categorized within low tier IT industries in

which the strategic role of IT is just providing information to others as cited in [25].

As for the extent of ITG implementation within the manufacturing, healthcare & pharmaceuticals, despite the differences in the grouping of the industries within IT tier industries and the strategic role of IT, it is reflected that the degree of ITG implementation is average. This extent of ITG implementation within the manufacturing sector as the average matches with [25].

Interestingly, another significant argument is underlined about the degree of ITG implementation within healthcare & pharmaceuticals which is despite the categorization of this sector among the high tier IT industries, in which the strategic role of IT is transformational one, the degree of ITG implementation is average, contradicting with [17], [19], [26], due to the lack of a very crucial aspect within ITG, which is change management governance, violating the study of [27], and other triggers (discoursed later). Moreover, it is added that the healthcare & pharmaceuticals industry is not as critical as the financials and communications and their IT budget size is not as huge as that of financials and communications.

Moving to the degree of ITG implementation within real estate and chemicals, it is remarkable that the degree of ITG implementation is not as high as the other sectors, supporting with [25]. They are both classified among low tier IT industries; in which the strategic role of IT is just providing information to others.

As an example, for the extent of ITG implementation in chemicals, the IT director of a chemical company commented: "Usually there are two main restrictions related to ITG implementation within our public sector organization which are decision making authority and the budget." Hence, it is inferred that the decision-making authority and IT budget related decisions are two main challenges that may affect ITG implementation within the public sector organization in fulfillment with [2].

An interesting fact to outline is the variations in the degree of ITG implementation between the companies within the same industry. So, within the real estate sector, the degree of ITG implementation in small medium sized companies (SMEs) is lower than huge organizations caused by some triggers in proportion to [28]-[32].

As formerly discussed that there are discrepancies in ITG implementation across the eight different industries within the Egyptian market; thus, ITG is highly implemented within the financials and communication sectors due to the criticality of both industries, the massive organization size (measured by the number of employees), the gigantic size of IT budgets, Big 4 auditor type (with referral to the annual reports), effective processes, IT performance monitoring measurements (KPIs), the information intensity expertise of the CIOs. Nonetheless, it is found that there are some triggers for ITG implementation restricted to the financial sector only, which are the presence of IT steering committees on board, private ownership and legal requirements imposed by the Central Bank of Egypt. It is worthy to mention that all formerly discussed ITG practices within the financials are compulsory since they are incorporated

within the regulations of the Central Bank of Egypt.

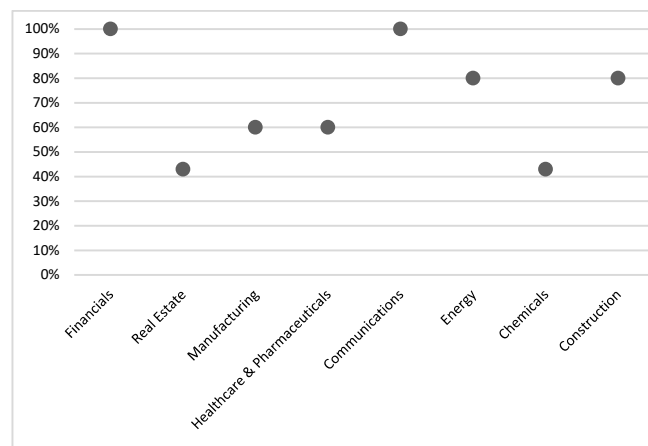


Fig. 1 ITG degree of implementation

The degree of ITG implementation within energy and construction sectors are above average (as perceived by the participants) caused by the significance of both industries, huge organization size (measured by the number of employees), Big 4 auditor type (by referral to the annual reports), huge size of IT budget, privately sized, the existence of IT steering committees on board, effective processes, IT performance monitoring measurements (KPIs), and the information intensity expertise of CIOs. On the other hand, it is deductible that the board's knowledge about ITG matters is highly amplified within the construction sector only due to the sensitivity of the industry as it is considered one of the fundamental pillars of the national economy.

Along the road, it is revealed that the extent of ITG implementation within the manufacturing, healthcare & pharmaceuticals attributed to some common factors which are the huge organization size, Big 4 auditor type, huge size of IT budget, privately sized, effective processes, IT performance monitoring measurements (KPIs), and information intensity expertise of the CIOs. Even though, it is concluded that there are some variations in the attributes of ITG between both sectors. As an example, the existence of IT steering committees on board is only restricted to the manufacturing sector. However, the weight of the board's knowledge among ITG matters is amplified within healthcare & pharmaceuticals as they are classified among high tier IT industries (heavily IT dependent industry); in which IT is extensively used within its whole operations.

Remarkably, the absence of IT steering committees on board within the health care & pharmaceuticals promotes a significant venue for discussion as they are grouped within high tier IT industries conflicting with [31], [33]-[35].

It is significant to mention the reasons for the differences in the extent of ITG implementation among the companies within the manufacturing sector (FMCGs and Steel).

The degree of ITG implementation within the steel manufacturing sector is higher due to the criticality of the business industry, the presence of IT steering committees on

board and the variations in the organization size. Lastly, the low degree of ITG implementation within real estate and chemicals in comparison to other sectors is affected by the absence of IT steering committees on board within both sectors, the degree of importance of both industries, the size of IT budget, the ownership structure, the degree of formalizing the processes and the information intensity expertise of the CIOs compared to prior sectors.

Additionally, it is reflected that the variation among the companies within the real estate sector can be reasoned to

multiple attributes which are the differences in the organization size (measured by the number of employees), the small size of IT budget, the less structured IT department, the strategic role of IT as an executive of a real estate company noted: "Alignment of IT and business is not an accurate definition for ITG, IT is considered to be a supporting function", the limited information intensity expertise of the IT director, lack of formal processes as ITIL and ISO27001 which is considered one of the central factors for an effective ITG implementation and poor knowledge of ITG matters among CEOs of SMEs.

TABLE I
ITG DETERMINANTS

Industry type	Industry criticality	Firm size	Big 4 auditor	Huge IT budget	Private Ownership	IT steering committees	Processes KPIs	Information expertise	Board's Knowledge	Legal requirements
Financials	√	√	√	√	√	√	√	√	-	√
Real Estate	-	√	√	√	√	√	√	√	-	-
Manufacturing	-	√	√	√	√	√	√	√	-	-
Healthcare& Pharmaceuticals	-	√	√	√	√	-	√	√	√	-
Communications	√	√	√	√	-	-	√	√	-	-
Energy	√	√	√	√	√	√	√	√	-	-
Chemicals	√	√	-	-	-	-	√	√	-	-
Construction	√	√	√	√	√	√	√	√	√	-

APPENDIX: INTERVIEW GUIDE

- 1- How many years of experience do you have in your current position?
- 2- What is your role within the relevance of information technology function?
- 3- Can you please tell me the hierarchy levels of IT within the organization?
- 4- In the previous financial year, what was your organization's annual IT budget as a percentage of the annual revenue?
- 5- Within your organization, what is the total number of employees?
- 6- Within your organization, what is the total number of employees working in the IT department?
- 7- What does ITG mean to you personally?
- 8- To what extent ITG is implemented within your organization? And can you please tell me about some examples for the ITG implementation?
- 9- How ITG is developed over the past years within the company?
- 10- Can you please tell me about the differences between the ITG implementation in your current organization and your previous one, if accessible?
- 11- In your opinion, how far does ITG affect the performance of the IT department and the business/organization performance?
- 12- Is it possible to clarify whether ITG is disclosed in the annual reports or not?
- 13- Within your organization, what are the determinants affecting the level of ITG implementation?
- 14- Can you please rank the importance of the determinants affecting the level of ITG implementation and why?
- 15- How does COVID-19 affect the digital transformation within the firm?
- 16- After the pandemic, what are the lessons learnt within the

information technology function?

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