Stakeholders of Egypt Public Universities and Research Institutions: An Information Technology Governance Perspective

Rasha M. El-Morshedy[(b)*], Sherif A. Mazen[(a)], Ehab Hassanein[(a)], Aly A. Fahmy[(a)] Mosaad K. Hassanein[(b)]

[(a)]Faculty of Computers and Information, Cairo University, Cairo, Egypt.
[(b)]Central Laboratory for Agricultural Climate, The Agricultural Research Center, Cairo, Egypt.
*rmorshedy@idecision.org

Abstract

Egypt public higher education and institutions (HEIs) have recognized the need to reassess their functions of teaching, research, and community services. Successful organizations are these providing value for their stakeholders. HEIs are indifference and their management need to identify their stakeholders' needs and to reposition their institutions towards the fulfillment of these needs. On their quest to enhance their competencies, Information Technology (IT) plays an important role of these institutions. Consequently, governance of It (or ITG) becomes a necessity. From the view point of, this paper aims to identify Egypt public HEIs stakeholders and their needs as the first and necessary step towards the successful implementation of ITG in Egypt public HEIs.

Keywords: *Egypt, public universities, research centers, information technology governance, COBIT.*

1. Introduction

Higher Education Institutions (HEIs) have been under pressure to carefully reassess their role in the society and to evaluate their relationships with their various constituents and stakeholders [1]. HEIs are faced with new challenges with respect to their key functions; education, research and innovation, and community service [2].

The situation in Egypt was indifference and, rather, much harder. For the past twenty years, Egypt public HEI witnessed an unprecedented challenges that have been significantly reflected on its operational effectiveness and efficiency. On one hand, and being totally dependent on governmental financial allocation, these institutions have suffered continual financial shortage that, in turn, lowered the availability and quality of its soft and hard resources. On the other hand, there have been many changes in their surrounding environment either locally or internationally. Such challenges, coupled with the fact of the highly competitive market demands, made no way for these institutions other than developing skills and competencies that were not previously required, specifically in terms of resource governance and management.

Egypt public universities, in particular, and Higher education institutions in general have recognized the need to reassess their functions of teaching and research. Recognizing such situation, Egypt has stated national goal for education in the 21st century as "to establish

a quality education system that provides learning experience relevant to current and future needs for Egyptian continued economic & social development [3]." To achieve this goal, several reform initiatives took place in the Egyptian educational system from primary to higher education. One of which is the "Higher Education Enhancement Project" (HEEP [4]) which started in the year 2002 and was financially supported by a loan from the World Bank.

One of HEEP major projects was the Information & Communication Technology Project (ICTP) which represented 21% of HEEP budget to be the cornerstone that is applied across the board to support ICT within the higher education. In turn, ICTP has several sub-projects. In Said [5], the basis for reform of the Higher Education system in Egypt was established as "how the Higher Education Reform Strategy was ratified on a sector-wide basis after the successful implementation of the Engineering and Technical Education project." Two of the guiding principles of his reform were: (1) self-governing institutions; and (2) improve performance of the higher education and research institutions using ICT. Again, ICTP came as one of the six priority reform projects reflecting the important role ICT play in enhancing Higher Education in Egypt.

Generally, the increasing role of IT has shifted administrative personnel to focus how IT can be exploited in the manner that maximizes the benefit of their organizations' stakeholders [6]. Accordingly, IT governance (ITG) became a necessity to establish the business value of IT and, thus, justifying investing on IT as means of supporting business objectives [7] [8]. The situation in universities and research institutions was indifference and the implementation of ITG gained much attention given major role IT offers to both education and research processes [8][9][10]. In Egypt, studies showed public HEIs have fairly low level of governance achievement on most IT processes with slight exceptions of processes that are governed by regular laws [11][12].

So, as the HEI mission is being expanded noticeably to stretch beyond teaching and research to include community benefit [13], and to survive in a competitively environment, HEI management need to reposition towards the identification of the needs of their stakeholders through effective identification of their future strategies [14]. With a focus on IT and, thus, from the vantage point of ITG, this paper aims to identify these stakeholders and their needs as the first and necessary step towards the successful implementation of ITG in Egypt public HE institutions.

Following the introduction, the reminder of this paper is organized as follows. Section 2 provides a brief background on stakeholder analysis in the context of public HEIs while section 3 provides a brief on the context – Egypt HEIs. Research methodology is presented in section 4 followed by results – stakeholders identification – in section 5. Linkage to ITG and Egypt Public HEI in given in section 6 and, finally, discussions and conclusions in section 7.

2. Stakeholder Analysis for Public HEIs

Throughout the world, an emphasis on how HEIs can re-take it its role in contributing to the welfare of the society is being given. Within such an understanding, public higher education institutions need to engage in profitable relationships with various stakeholders and,

thus, re-thinking and re-aligning their vision, governance, management, and operational mechanisms to achieve such goal.

Generally, a stakeholder is any individual - or group of individuals - either impacted upon by or able to impact on the achievement of an organization's objectives [15]. Identifying these stakeholders and understanding their potential impact on or by the organization become a necessity for the top management to take into consideration when analyzing the expected outputs and outcomes of various activities within the organization. Such understanding is extended to include public and non-profit organizations [16].

For HEI, [13] stressed the increasing needs for these institutions to maintain a coherent relationships with its community of stakeholders that of greater depth than only simple maintenance of contacts. Stakeholders' demands will affect the governance and management practices of HEI and will push them to reconsider their operations/business model [17]. Within this framework, Egypt public HEI still have much to be done to ensure coherent interaction with their communities and to correctly identify the stakeholders involved with the institutions.

Organizations do not exist in an empty space, organizations exist in society to provide goods/services needed by customer. In other words, organizations create value for their stakeholders. Consequently, an organization needs to satisfy its customers' needs, through efficient use of available resources, and with optimal risk exposure. COBIT 5 was built upon such view of value creation and governance taking into consideration the variability associated with various stakeholders' view of expected benefits. resource usage and risk exposure [18]. COBIT 5 (The Control Objectives for Information and related Technology) provides "a comprehensive framework of globally accepted practices that helps enterprise leaders create optimal value from information and technology by maintaining balance amongst realizing benefits and optimizing risk levels and resource use" by providing needed structure and tools to deliver trust and value, manage risk, avoid potential public embarrassment and maximize opportunities [19].

As organizations operate in different contexts that is characterized by two sets of factors (external and internal), a universal (generic) governance system will not exist, but rather a customized one. COBIT 5 adopts a goal cascading approach in which stakeholders' needs are translated into specific organizational goals that, in turn, translated into specific IT-related goals that, again, translated into enabler goals. This approach will guarantee that are functional areas across the organization are working together towards achieving the stakeholders' needs and will help ensuring that IT is aligned with – and support – the organization business [18].

To provide a sort of guidelines, COBIT 5 provided a list of organization stakeholders and their potential concerns on the governance and management of enterprise IT. These guidelines will form the base upon which this paper will identify stakeholders in Egypt public HEIs and their IT-related concerns/needs.

3. Context : Egypt Public Higher Education and Research System

In general, there are two parallel education systems prevailing in Egypt: the secular system and the religious, or Al-Azhar system. The secular system is organized into three levels; basic education, secondary schools, and higher education. The higher education sector in Egypt is comprised of universities and institutions of technical and professional training. Higher education in Egypt can, further, be categorized into the public higher education sector, comprised of public universities and non-university institutions, which is dominant and large, and the private higher education sector mainly comprised of a small number of private universities. Although the American University in Cairo (AUC) has existed since the year 1919 as a private university, Egypt only legalized Egyptian private universities in 1992.

So, currently, this system for the year 2012/2013 is made up of 22 public universities, 1 non-secular public university, as well 58 public non-university institutions [57 of them are two-year technical institutes; however only 1 is three-years technical institutes], 18 private universities, 3 academies, 127 private higher institutes, 5 diversified specialty institutes (private), and 10 private middle institutes. Those who are four or five-years institutes are both private higher institutes and diversified specialty institutes [20]. Depending on the field, a bachelor's degree is obtained in between three and seven years of study, for example 4 years for a bachelor in commerce and 7 years for a basic medical degree.

In the early 70's, Egypt established the Academy for Scientific Research and Technology (ASRT) as the governmental body responsible for guiding Egypt scientific research – that was for a great extent funded by the government back then. The role of ASRT evolved with time to act as Egypt public house of expertise. Although ASRT supervises most of Egypt largest research institutions, several ministries proceeded to establish their own research institutions in a way that a ministry would have a research institution that focuses only on research topics related to the work of this ministry. Accordingly, in addition to public universities – that carries out research, and research institutions following ASRT directly, 13 ministries have their own research institutions (usually referred to as research centers).

The focus of this paper is on public universities (that carry out education, research, and society services) and research institutions (that carry out research and society service but not academic degree granter).

4. Methodology

In organizations, the process of identification of an organization' stakeholders is an activity to be carried out by top management [16] [21]. Several techniques (as outlined by [16]) exist that help organization in this quest. In HEI literature, as will be presented in the following section, many research articles have carried out empirical fieldwork to identify the stakeholders for a particular HEI. This was done mainly through interviewing senior and other managerial levels of that HEI.

Previous research work aimed to identify stakeholders and their influence by/on an institution in general. This research will go much deeper by examining HEI stakeholders from a specific view; ITG. This research will follow four steps: (1) from the literature, HEI

stakeholders will be identified; (2) Pareto analysis will be used to focus on a subset of most important stakeholders and this subset will be checked against Egypt public HEIs; (3) using COBIT 5, wants and needs of these stakeholders will be identified; and finally (4) these wants/needs will be mapped to Egypt HEIs.

5. Results : Stakeholders Identification

Identifying the stakeholders involved in HEIs is an essential step towards establishing competitive advantages for these institutions through recognizing their needs and setting up the means to meet these needs [22]. This identification, however, is not an easy task given the specific nature of these institutions.

The body of knowledge shows a noticeable number of research articles that tried to identify - for various HEIs – their stakeholders, their expectations/needs, their impact on the institutions, etc. Table 1 provides 31 papers that tried to do so. Collectively, throughout the papers, 20 stakeholders were identified, out of which 15 external and 5 internal. To help determining the most important stakeholders, Pareto diagram illustrated by Figure 1 is used. The number of times (frequency) a stakeholder was identified by a research paper will be used as a proxy of how the importance of a specific stakeholder was perceived.

Several conclusions can be drawn out of this analysis. Of course, being the main customer of most of HEIs, students were the most identified stakeholder (with 71% of the reviewed papers and 11.2% of total identifications). Local community came the second most identified stakeholder (with 61% of the reviewed papers and 9.7% of total identifications). Results also show that focus on administrative staff and employees and their role was slightly higher than that of the teaching staff. Identifying competitors as a stakeholder came relatively late in the list (in 13 out of the 31 papers). However, a quick look at Table 1 reveals that 6 of these papers were cited in the years 2007 and after indicating the change of perception of how these institutions should work and seen; as a business (although non-profit) rather than being isolated from their surroundings. This is also aligned with the increased focus on business community as a stakeholder (starting late 2000). Finally, the low focus on Technical staff (identified in only 1 paper) can be reasoned to the hidden nature of their role compared to obvious functions such as teaching. Nowadays, however, we think that such role and importance have changed given the increasing dependency of technology in general and ICT in particular.

Table 1. HEI stakeholders as identified by various research papers

Year	Reference	Stakeholders																			
		Internal										External									
		students	management	Teaching staff	Employees and administrative staff	Technical staff	Government	media	Student parents	Service providers	Regulatory agents	Former students	Local community (public in general)	Competitors(academic community)	Business community	Former ins/uni member	suppliers	Secondary school	Ministry of education	Political parties	Financial support
1976	[23]	X	X	X	X		X		X				X								
1984	[24]								X	X	X										
1994	[25]	X			X				X			X									X
1995	[26]		X	X		X	X	X	X	X			X	X	X						
	[27]	X	X	X	X		X	X		X	X	X	X	X	X	X					
1996	[28]	X		X	X							X	X		X						
	[29]			X	X		X	X													
	[30]	X		X	X		X		X	X				X	X		X				
1997	[31]	X	X		X		X		X				X								
1998	[32]	X			X				X				X								
	[33]	X		X	X		X		X	X			X	X	X		X	X			
1999	[34]		X		X		X						X	X							
2000	[35]	X	X	X	X		X	X					X							X	
	[36]				X							X	X								
2001	[37]												X								
	[38]	X		X			X				X	X									X
2002	[39]	X			X		X		X				X	X							
	[40]	X	X	X	X		x		x		X		X		X						
2003	[41]	X			X		X				X		X	X							
2006	[42]	X		X	X								X			X		X			
2007	[43]										X			X					X	X	
	[44]	X		X					X		X			X						X	X
	[45]	X		X			X	X	X		X		X	X	X			X			X
	[46]	X							X		X			X	X						
2008	[47]	X		X	X							X			X						
	[2]	X	X	X	X		X					X		X	X						
	[48]	X	X	X			X		X				X		X						
2009	[49]									X				X	X						X
	[50]														X						
2011	[51]	X	X	X			X			X			X		X						X
	[52]	X	X	X					X	X			X		X					X	X
No.		22	11	17	18	1	17	5	15	8	9	7	19	13	15	2	2	3	1	4	7
% of the 31 papers reviewed		71	35	55	58	3	55	16	48	26	29	23	61	42	48	6	6	10	3	13	23

Table 2. Stakeholders ranked zccording to their frequency of selection by literature

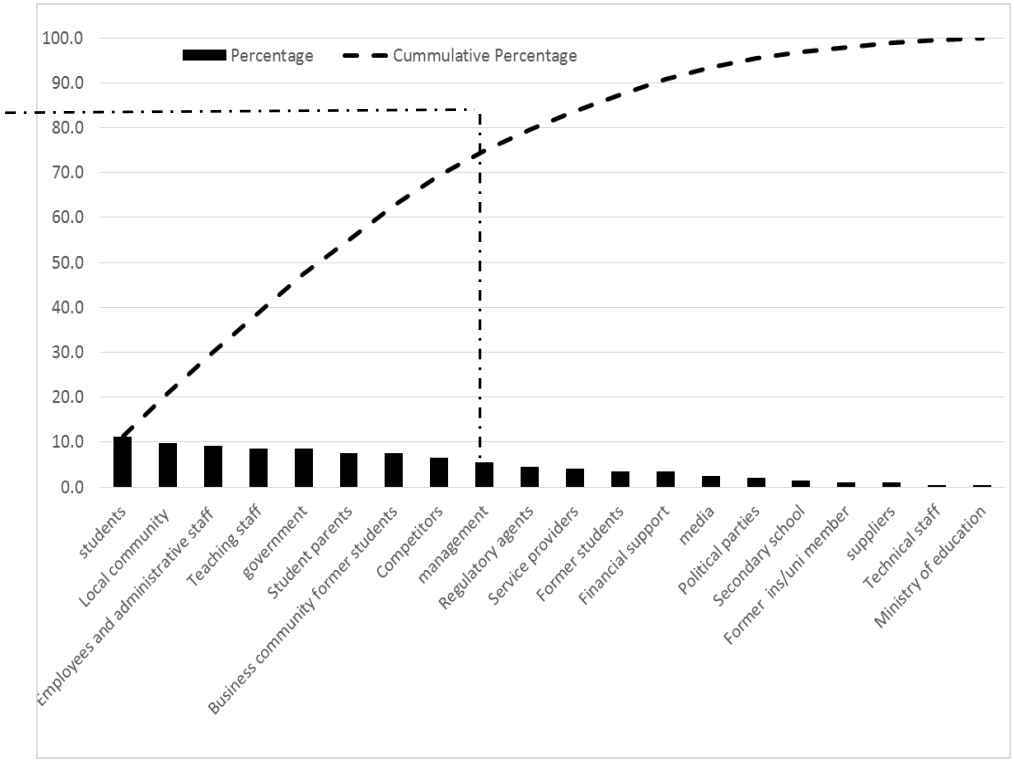

Figure 1. Pareto Diagram

As a guidance and according to Pareto rule, we shall select those stakeholders that %cumulative add up to 80%. Here, we will select the first 11 stakeholders with 83.7 %cumulative. to better fit with the ITG perspective, however, a small shift will be introduced by eliminating "local community" and introducing "technical staff" from the end of the list. It is totally understood the weak focus "technical staff" had in the literature can be reasoned the traditional education view. But given the increasing use and importance of IT, the authors see that such stakeholder should be in focus.

6. Linkage to ITG and Egypt Public HEIs

Within the ongoing transformation process of Egypt public HEIs, ICT was thought as the cornerstone of enhancing their functions. This section will provide the first step towards a successful implementation of ITG in these institutions by viewing their stakeholders from an ITG perspective. After extracting HEIs stakeholders form the literature and identifying the most important ones, this section will move further by: (1) mapping those stakeholders to stakeholders as defined by COBIT and, then, (2) mapping then once more to Egypt HEIs administrative structures. Table 2 reports on this two-stage mapping.

In Table 2, stakeholders broadly defined by COBIT are listed in the first column and following the same classification from the literature review, they are divided into internal and external stakeholders. It should be noted here that this listing follows a business (profit organization) view. The second column maps the 11 stakeholders identified from the literature

to those of COBIT providing a generic link between ITG and HEIs in general. Finally, with more focus on Egypt, the third and fourth columns map those stakeholders to the administrative structure of Egypt public universities and research institutions, respectively.

The first remark that worth mentioning here is the positioning of‘students’ as a stakeholder. From a market-oriented view, students are the organization (university) customers and, thus, they are external stakeholders. However, from an academic-oriented view, students are a key part of the university – although temporarily for the limited period of their studies – and, thus, they can be viewed as an internal stakeholder. Moreover, the mapping as illustrated by the Table reveals several important points.

There are two positions that need to be introduced – and/or – activated in Egypt public HEIs; these are, Chief information officer (CIO) and Chief risk officer (CRO). Both positions are on the executive level. The first, CIO, will provide vision and leadership for the development and deployment of IT-related initiatives aligned to intuition strategic functions and objectives. The latter, CRO, will lead efforts needed for the continual identification, analysis, and mitigation of all potential internal and external risks that can threaten the HEI. Both functions either do not exists or not well developed in Egypt public HEIs and both are of high importance. Given the increasing complexity of HEIs processes, variety of departments (academic and administrative) with shared limited resources, effective management of various business processes (related to education, research, etc.) is needed to enhance HEI functionality and to put more focus on stakeholders’ needs. More developed administrative structures are need for managing IT across the university/research institution. positions such as chief architect and IT security manager need to be introduced.

Internal stakeholders share a set of concerns with respect to the role IT plays and consequently, ITG. these can be summarized as: (1) Value generation from IT (attaining institutional objective, quality of services, etc.) - e.g. that supports students and their parents’ concerns for quality education, valued degrees, and an appropriate academic environment; (2) Management of IT (related department structures, managing IT outsourcing arrangements, etc.) that forms the base for a well-managed university, and provides academic (teaching and research staff) with improvement opportunities, smooth functioning , financial management, and good Governance; (3) Assurance over IT (security, IT-related risk, information management, etc.); (4) IT Human Resources management (IT personnel availability, qualifications, performance, etc. that supports, for example, employees need for achievements, benefits, recognition, and successful career development; (5) IT resources (control for the effectiveness and efficiency of expenditure and optimized running costs, success IT projects); (6) IT operations (efficiency and performance to ensure alignment with business objectives and sustainability, availability, reliability, etc.); (7) IT supporting compliance to regulations; (8) IT decisions making (process, transparency, efficiency, etc.); and (9) IT for supporting business (adequacy of IT infrastructure and environment to meet strategic and operational needs, business processes that are highly dependent on IT, etc.).

On the other hand, external stakeholders share a different set of concerns, these are: (1) Security and reliability of business operation; (2) Compliance with applicable regulations; (3) Effectiveness on the internal control system; and (4) Effectiveness and efficiency of information management. These concerns evolve around how IT will support smooth

functioning , financial management and good Governance for service providers. For government, how IT will enhance the quality of functions (education, research, etc.) and a successful prosperous institution.

Table 2. Mapping of stakeholders

Stakeholders as broadly defined by COBIT		Mapped to stakeholders identified by the literature	Mapped to Egypt Public	
			Universities (HE)	Research Initiations (RI)
Internal	Board and Executive Management • Board • Chief executive officer (CEO) • Chief financial officer (CFO) • Chief information officer (CIO) • Chief risk officer (CRO)	Management	In general, the management positions (stakeholders) will exists but under different titles. With expectation of university CIO, the no other direct IT-related position exists on the executive level. CFO function is carried out by "general secretary" on both university and faculty level and the same in RIs.	
			• Board • University president and vice-presidents • Faculty dean and vice-dean • University CIO	• Board • Center president and vice-presidents • institute/central lab director and vice-director
	Business management and business process owners • Business executives • Business process owners • Business managers		Another major difference here. there exist two parallel structures; academic (teaching/research) structure representing the major institutional functions, and administrative structure representing the supporting functions.	
			• Academic departments heads • administrative units' heads	• Academic units heads • administrative units' heads
	IT management and IT process owners, e.g., • Head of operations • Chief architect • IT security manager • Business continuity management specialist • IT managers	Technical staff	These specific titles do not exist.	
			Head of IT department on the faculty level.	Head of IT department on the institution/lab level.
	Compliance, risk management and legal experts		These specific titles do not exist.	
			Legal department head on both university and faculty level.	Legal department head on both center and institution/lab level.
	Internal audit		Internal audit department on the university level.	Internal audit department on the center level.
	Employees	• Teaching staff • Employees and administrative staff	• Faculty members and their assistants • Employees and administrative staff	• Research staff and their assistants • Employees and administrative staff
	Human resource (HR) manager		• HR committee on the university level • HR department on the faculty level	• HR committee on the center level • HR department on the institution/lab level

Stakeholders as broadly defined by COBIT		Mapped to stakeholders identified by the literature	Mapped to Egypt Public	
			Universities (HE)	Research Initiations (RI)
Eternal	IT service providers	Service providers		
	Regulators/government	Government	• Supreme Council for Universities • Ministry of Higher Education • Research support bodies	• Corresponding ministry • Academy of Science and Technology • Research support bodies
	Customers	• Students • Student parents	• Students • Student parents	• Corresponding ministry
	External auditors			
	Business partners	Business community	• co-financiers of research and teaching services	• co-financiers of research
	Suppliers		• Secondary school, other universities and institutes, service suppliers, utilities.	• Universities • Other institutes
	External users		• Society in general	• Society in general
	Standardization organizations	Regulatory agents	• Accreditation bodies • Professional associations	
		Competitors	• Private and public providers of post-secondary education	• Private research centers

7. Reflections on current HEI structures in Egypt: A case study

This discusses a proposal on how ITG can be streamlined into HEI organization structure in Egypt. The case of Cairo University will be the focus here. Cairo University contains 20 faculties - that offer both undergraduate and graduate studies, 5 research institutes – that award postgraduate degrees, 153 centers- that offers services to the community in the form of training, consultation, etc., and 8 public hospitals. The overall organization structure of Cairo University, as shown in Figure 2, assumes a matrix structure in which various functions within the university are being carried out on two levels; university and faculty/institute level. These functions are divided among four sectors; teaching and students affairs (undergraduate), graduate studies and research, community service, and administration. Each of the first three sectors is being led by a vice president (a faculty member) while the administration sector is headed by a general secretary. The three sectors also exist on faculty/institution level.

With respect to IT, the position of CIO is there but without well-defined rigor duties, responsibilities, or authorities. In a step towards better use of IT assets, the university has established the Cairo University center for Electronic and Knowledge Services that, in turn, divided into six centers each headed by a manager (a faculty member). These are: communication and information network, management information systems, e-learning, digital library, IT training, and web portals. Still, however, links to the lower level (faculty/institution) are not established in the proper manner. IT-related functions on the

faculty level is being carried out through a genera 'labs' department. So, the degree of professionalism and experience will differ from one faculty/institute to the other.

Given the decentralized nature of the structure, and from a planning perspective, each faculty/institute assumes a relatively high degree of autonomy that results in the existence of a variety of IT infrastructure and information systems with different configurations. Few years ago, several projects took place to enhance the overall IT infrastructure in the university. And, recently, several attempts were taken by the CIO supported by the university top management towards establishing a centralized IT planning and services' management.

The proposed new positioning of IT-related management and governance structures includes the introduction of nine positions/units/functions as shown in Figure 3. These are: (1) Chief Information Officer (CIO) - responsible for carrying out the ITG strategy that been developed by the steering committee; (2) IT Steering (executive) Committee (ITSC) - a two layers-functional team contain IT and business members with the responsibility for defining the enterprise strategy toward adapting an ITG framework with its structure that define the roles of other players, their duties and the suitable communication system between them; (3) Program Management Office (PMO) - will have the authority to follow the execution of different phases of ITG embedding in the enterprise with the required documentation, evaluation and assessment processes; (4) IT Architecture and Design Officer (ITADO) - responsible for setting the infrastructure for the adapted ITG framework; (5) IT Operations Officer (ITOO) - ensure carrying out and executing all related to executing ITG operational activities within allocated resources and timeline; (6) Information Security Officer (ISO) - not just securing information but also managing it is a must, taking into consideration of issues related to leadership, organizational structures and processes related to information assets securing; (7) IT Compliance Officer (ITCO) - make sure that IT compliance is performed within the defined IT policies in the organization; supervise and implement the required IT governance and security policies; (8) Central IT Unit; and (9) IT Unit.

Technical staff responsible for the operations of IT infrastructure and systems will be responsible for centrally-managed systems and services (through the central IT unit) and for the locally-managed systems and services on the faculty/institute level (through the It unit to be established in each faculty/institute). The advantage of this design is of two-fold. On one hand it consolidates and coordinates university-wide IT-related activity through a central unit to guarantee: (a) the homogeneity and integration of all IT assets, (b) the effective management of IT systems and related services, and (c) optimization of resources. And, on the other hand, it has centrally located staff in each faculty/institute to guarantee: (a) effective communication with the university, and (b) fast response to local demand and problem solving.

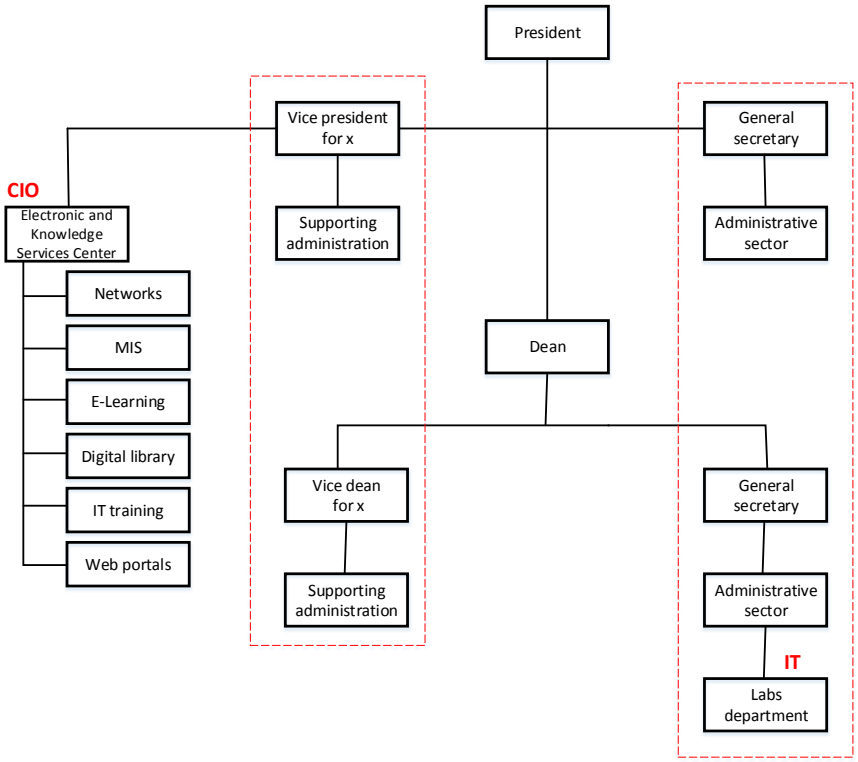

Figure 2: Current IT Management within Cairo University Organization Structure

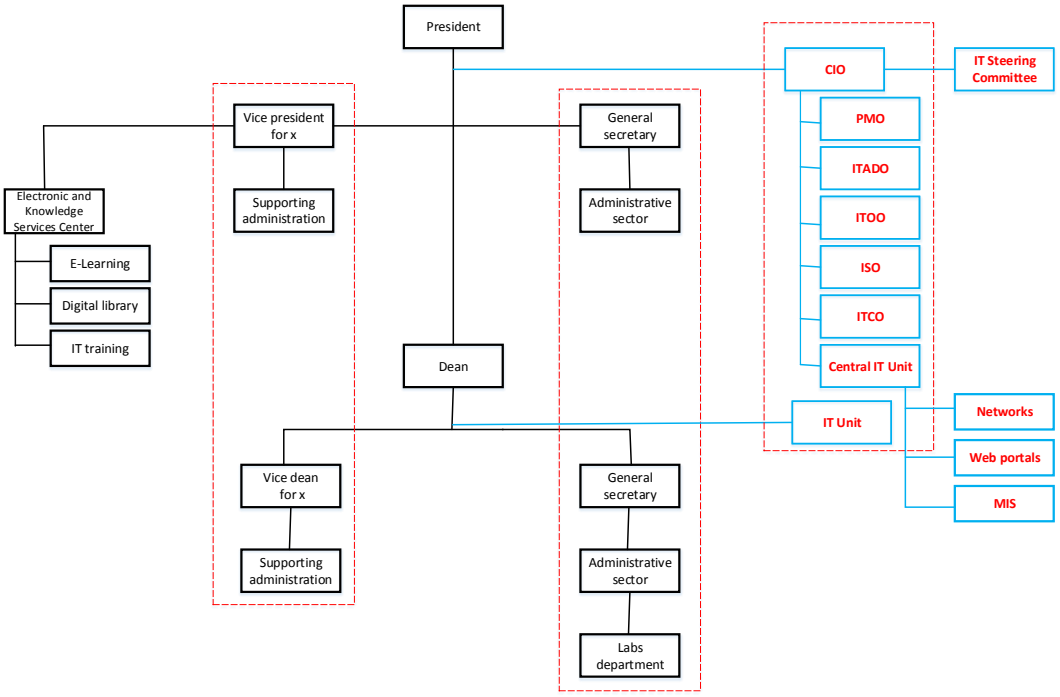

Figure 3: Proposed positioning of IT Management within Cairo University Organization Structure

8. Discussions and Conclusions

Organizations exist to create value for their stakeholders through efficient use of available resources, and with optimal risk exposure. Faced with many challenges in their surrounding and highly competitive market demands, public higher education and research institutions (HEIs) in Egypt have recognized the emerging need to reassess their function and to enhance their competencies.

With the increasing role of Information Technology (IT) that has shifted the focus to how such tools can be exploited in the manner that maximizes the benefit of HEIs stakeholders, IT governance (ITG) became a necessity to establish the value of IT as means of supporting institutional objectives.

This paper aimed to set the first step towards the successful implementation of ITG in Egypt public HIEs by identifying the stakeholders of these institutions and their needs from an ITG perspective. To do so, HEI stakeholders were extracted from the literature and a subset of the most important ones was determined using Pareto analysis. This set was, then mapped to ITG stakeholders – based on COBIT 5, The Control Objectives for Information and related Technology – and, once more, mapped to Egypt public universities and research institutions.

The paper was able to reach a group of 11 stakeholders classified into internal and external stakeholders. Their needs from IT was discussed in view of COBIT 5. The analysis revealed the followings: (1) the importance of stakeholders analysis for HEIs specially with the changing role of these institutions and the increasing involvement of IT; (2) for a successful ITG implementation in Egypt public HEIs, several administrative positions and structures need to be introduced; (3) the existence of a considerable number of stakeholders variety of needs necessitates the establishment of a mechanisms for managing this issue; and (4) effective analysis and management of stakeholders will be reflected on how ITG implementation should take place (will set priorities).

Finally, as this research was based on published literature, two future research points are proposed: (1) further validation and refinement of the findings with subject matter experts, and (2) investigating the how the role of the Information Technology Governance in Egypt Public Universities and Research Institutions is perceived by various stakeholders.

References

[1]. I. Marić, “Stakeholder Analisys of Higher Education Institutions,” *Interdisciplinary Description of Complex Systems*, vol. 11, no. 2, pp. 217–226, 2013.

[2]. B. Jongbloed, J. Enders, and C. Salerno, “Higher education and its communities: Interconnections, interdependencies and a research agenda,” *Higher Education*, vol. 56, no. 3, pp. 303–324, 2008.

[3]. M. E. Said, “An Overview of the Higher Education Enhancement Project (HEEP),” presented at the Worlddidac, Basel, 25-Oct-2006.

[4]. “Higher Education Enhancement Project.” [Online]. Available: http://www.heep.edu.eg/.

[5]. M. E. Said, "Philosophy of reforming higher education in egypt and the road ahead," Cairo, Egypt, 2008.

[6]. S. Khanyile and H. Abdullah, "COBIT 5 an evolutionary framework and only framework to address the governance and management of enterprise IT," University of South Africa - School of Computing.

[7]. E. Guldentops and S. De Haes, "COBIT 3rd Edition Usage Survey: Growing Acceptance of COBIT," *Information Systems Control Journal*, vol. 6, pp. 25–31, 2002.

[8]. R. Yanosky and J. B. Caruso, "Process and Politics: IT Governance in Higher Education," *ECAR Key Findings*, 2008.

[9]. A. Fernández and F. Llorens, "An IT Governance Framework for Universities in Spain," in *Proceedings of the EUNIS 2009 Conference, Santiago de Compostela, June 23rd to 26th*, 2009.

[10]. J. Bhattacharjya and V. Chang, "Evolving IT Governance Practices for Aligning IT with Business - A Case Study in an Australian Institution of Higher Education," *Journal of Information Science and Technology*, vol. 4, no. 1, 2007.

[11]. R. M. El-Morshedy, S. A. Mazen, E. Hassanein, A. A. Fahmy, and M. K. Hassanein, "Exploring Information Technology Governance (ITG) Practice in Research Institutions: An Empirical Study," *International Journal of Computer and Information Technology*, vol. 03, no. 03, pp. 557–564, 2014.

[12]. R. M. El-Morshedy, S. A. Mazen, E. Hassanein, A. A. Fahmy, and M. K. Hassanein, "Information Technology Governance in Egypt Research Institutions – A Case Study," presented at the The second International Conference on Engineering and Technology (ICET 2014), Cairo, Egypt, 2014.

[13]. B. Jongbloed, J. Enders, and C. Salerno, "Higher education and its communities: Interconnections, interdependencies and a research agenda," *Higher Education*, vol. 56, no. 3, pp. 303–324, 2008.

[14]. P. Laredo, "Revisiting the third mission of universities: toward a renewed categorization of university activities?," *Higher education policy*, vol. 20, no. 4, pp. 441–456, 2007.

[15]. R. E. Freeman, "The politics of stakeholder theory: Some future directions," *Business ethics quarterly*, pp. 409–421, 1994.

[16]. J. M. Bryson, "What to do when stakeholders matter: stakeholder identification and analysis techniques," *Public management review*, vol. 6, no. 1, pp. 21–53, 2004.

[17]. P. Arbo, P. Benneworth, and others, "Understanding the regional contribution of higher education institutions," 2007.

[18]. Information Systems Audit and Control Association. ISACA, *Cobit 5: A business framework for the governance and management of enterprise IT*. Rolling Meadows. IL, 2012.

[19]. IT Governance Institute, "COBIT 5 Executive Overview." 2012.

[20]. *Egypt Education Statistical Yearbook*. 2014.

[21]. R. K. Mitchell, B. R. Agle, and D. J. Wood, "Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts," *Academy of management review*, vol. 22, no. 4, pp. 853–886, 1997.

[22]. E. W. Mainardes, H. Alves, and M. Raposo, "An exploratory research on the stakeholders of a university," *Journal of Management and Strategy*, vol. 1, no. 1, p. p76, 2010.

[23]. T. Weaver, "What Is the Good of Higher Education?.," *Higher Education Review*, 1976.

[24]. L. R. Smith and S. T. Cavusgil, "Marketing planning for colleges and universities," *Long Range Planning*, vol. 17, no. 6, pp. 104–117, 1984.

[25]. T. Conway, S. Mackay, and D. Yorke, "Strategic planning in higher education: Who are the customers," *International Journal of Educational Management*, vol. 8, no. 6, pp. 29–36, 1994.

[26]. P. Kotler and K. F. Fox, "Strategic marketing for educational institutions," 1995.

[27]. R. E. Taylor and R. R. Reed, "Situational marketing: application for higher education institutions," *Journal of Marketing for HIGHER EDUCATION*, vol. 6, no. 1, pp. 23–36, 1995.

[28]. J. Licata and G. L. Frankwick, "University marketing: a professional service organization perspective," *Journal of Marketing for Higher Education*, vol. 7, no. 2, pp. 1–16, 1996.

[29]. M. S. Owlia and E. M. Aspinwall, "A framework for the dimensions of quality in higher education," *Quality Assurance in Education*, vol. 4, no. 2, pp. 12–20, 1996.

[30]. P. Sandison,, "New structures and functions for the new university," presented at the the National Committee of Inquiry into Higher Education, London, UK, 1996.

[31]. J. Rowley, "Beyond service quality dimensions in higher education and towards a service contract," *Quality Assurance in Education*, vol. 5, no. 1, pp. 7–14, 1997.

[32]. R. S. Franz, "Whatever you do, don't Treat your Students Like Customers!," *Journal of Management Education*, vol. 22, no. 1, pp. 63–69, 1998.

[33]. L. R. Reavill, "Quality assessment, total quality management and the stakeholders in the UK higher education system," *Managing Service Quality*, vol. 8, no. 1, pp. 55–63, 1998.

[34]. B. Macfarlane and L. Lomas, "Stakeholder conceptions of quality in single company management education," *Quality Assurance in Education*, vol. 7, no. 2, pp. 77–84, 1999.

[35]. J. J. Duderstadt, "Fire, ready, aim! University decision-making during an era of rapid change," *Governance in higher education: The university in a state of flux*, pp. 26–51, 2001.

[36]. J. Rosenberg, *Relation between university marketing and its strategy, Marketing of higher education institution: compendium of good practice.* Prague:: Czech Technical University, Faculty of Mechanical Engineering, 2000.

[37]. H. I. Costin, "An empirical study of strategy-structure-performance relationships of graduate business schools and AACSB accredited MBA programs," Boston University, 2001.

[38]. M. Tam, "Measuring quality and performance in higher education," *Quality in higher Education*, vol. 7, no. 1, pp. 47–54, 2001.

[39]. A. Amaral and A. Magalhaes, "The emergent role of external stakeholders in European higher education governance," in *Governing higher education: National perspectives on institutional governance*, Springer, 2002, pp. 1–21.

[40]. L. Baldwin, "Total quality management in higher education: the implications of internal and external stakeholders perceptions.," Graduate School in Business Administration, New Mexico State University, Las Cruces, USA, 2002.

[41]. K. Watty, "When will academics learn about quality?," *Quality in Higher Education*, vol. 9, no. 3, pp. 213–221, 2003.

[42]. A. Zait, "Higher education marketing: stakeholders' perceptions, degree of trust and desired student abilities: case of Romania (preliminary raw results)," *Working Paper Series, Social Science Research Network (SSRN)*, 2006.

[43]. H. Giesecke, "Gaining legitimacy: a continuum on the attainment of recognition," in *Slantcheva, S. and Levy, D. (Eds.), Private higher education in post-communist Europe*, New York: Macmillan, 2007, pp. 95–118.

[44]. M. Pachuashvili, "Legitimacy sources and private growth in post-communist context," in *Slantcheva, S. and Levy, D. (Eds.), Private higher education in post-communist Europe*, New York: Macmillan, 2007, pp. 75–94.

[45]. S. Slantcheva, "Legitimating the difference: private higher education institutions in Central and Eastern Europe," in *Slantcheva, S. and Levy, D. (Eds.), Private higher education in postcommunist Europe*, New York: Macmillan, 2007, pp. 55–74.

[46]. D. Suspitsin, "Between the state and the market: sources of sponsorship and legitimacy in Russian nonstate higher education," in *Slantcheva, S. and Levy, D. (Eds.), Private higher education in post-communist Europe*, New York: Macmillan, 2007, pp. 157–178.

[47]. P. Blazey, H. Ashiabor, and P. Janu, "Stakeholder expectations for generic skills in accounting graduates: Curriculum mapping and implications for change," *Macquarie Law WP 2008*, vol. 13, 2008.

[48]. R. Kasetwar, "Quality and Relevance in Indian Higher Education," *University News*, vol. 46, no. 46, pp. 17–23, 2008.

[49]. H. Matlay, "Entrepreneurship education in the UK: a critical analysis of stakeholder involvement and expectations," *Journal of Small Business and Enterprise Development*, vol. 16, no. 2, pp. 355–368, 2009.

[50]. N. Junichi and O. Hiroyuki, "Has the industrial cluster project improved the R&D efficiency of industry-university partnership in Japan?," Center for Research on Contemporary Economic Systems, Graduate School of Economics, Hitotsubashi University, 2008.

[51]. S. F. Tang and S. Hussin, "Quality in higher education: A variety of stakeholder perspectives," *International Journal of Social Science and Humanities*, vol. 1, no. 2, pp. 126–131, 2011.

[52]. K. Singh and S. Weligamage, "Thinking towards stakeholder satisfaction in higher education: An application of performance prism," presented at the 2nd International

Conference on Business & Information, University of Kelaniya, Kelnaiya city, Sri Lanka, 2011.