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## PUBLIC PRIVATE PARTNERSHIP PROJECTS: CONCESSION PERFORMANCE MEASUREMENT

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### ABSTRACT:

**Purpose** - Public Private Partnership (PPP) has increased in popularity and is being extensively in the construction market. For PPP projects already completed or for progress, the question is how effective are these projects? Do they meet their performance requirements and are they valuable to the stakeholders? How are PPP project performance assessed? The main target of this paper is to cover the necessity of studying key performance indicators (KPIs) that will measure and enhance PPP performance in Egypt.

**Design/methodology** - A questionnaire survey was conducted to prioritize the functional KPIs for PPP projects. Reliability analysis using the Cronbach's alpha test was performed to check the internal consistency and reliability of the results.

**Finding** - The result of this research will be to contribute to the existing understanding of performance measurement of developing countries, by providing a framework for selecting KPIs to measure the PPP concessionaire performance. Validation of results was done by experts.

**Social** - The partnership provides a competitive and transparent mechanism to pursue opportunities that bring together ideas, experiences and skills of both sectors and develop creative solutions to a community's needs.

**Originally/value** - It is targeted that government adopts an evaluation system of concessionaire selection based on performance. The results could be used to create performance models for evaluating PPP project performance.

**Keywords:** Public-Private Partnerships (PPP), Infrastructure, Concession, Key performance Indicators (KPI), Functional KPIs.

### 1. INTRODUCTION

The procurement of infrastructure and other construction projects has changed significantly in recent years. One of the latest is implementing Public Private Partnership (PPP) involvement of private sector, in partnership with government, has been promoted as a means of improving development of infrastructure and service delivery of various sectors. This concept is not a new one. In 1589, Perrier brothers were contracted to construct a water supply system in Paris.

The United Kingdom has pioneered the trend. Through its Private Finance Initiative (PFI). PPPs allow governments to improve the quality and accessibility of public services without burdening public finances. PPP can also provide more Value for Money compared to other forms of procurement and production due to private sector innovation (Ismail, 2013) and better risk allocation. Countries with remarkable PPP experience have found that PPPs manage financial and execution better than traditional

## PUBLIC PRIVATE PARTNERSHIP PROJECTS: CONCESSIONAIRE PERFORMANCE MEASUREMENT

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procurement methods, typically attributed to the incentives created by the PPP structure. In the other hand, the limited number of private partners that are suitable to these types of projects might limit the competitiveness required for cost-effective.

Egypt similar to other developing countries, used PPP to providing a new investment in the required infrastructure projects. PPP has the ability to reduce borrowing, create local long-term funding markets, stimulate job creation and improve quality of public services to the Egyptian peoples. Egypt's PPP policy framework is based on performance-based contracts (Egypt PPP Central Unit). Many of the completed projects have been considered as successful, but the question is how to measure and this success?

## 2. LITERATURE REVIEW

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PPP is increasing in popularity and is being used widely for infrastructure development in the global construction market (Tang et al. 2010). PPP arrangements have been driven by limitations in public funds and the need to leverage expertise from the private sector to improve the quality and efficiency of public services (Grimsey and Lewis, 2005). The financial crisis of 2008 renewed the attention on PPP projects (Greve and Hodgson, 2009). PPPs are unlikely to completely replace traditional methods of investment in infrastructure projects. PPP runs on the boundary of the public and private sectors (Lienert, 2009). Politically, they represent a third way in which governments can provide certain services (Grimsey and Lewis, 2005). The development of PPP is part of a general trend towards increasing private sector participation in public infrastructure development (Harris, 2003). PPPs are often considered a 'solution for all problems' by some government institutions in providing the required services, especially infrastructure (Cagnino et al., 2008). Due to pressure arising from increasing demands, levels, and the deteriorating state of infrastructure, many governments were forced to introduce Public Private Partnerships (Buckberg et al., 2015). The challenge to the PPP market is to ensure that projects can be financed under current market conditions and that they still can deliver value (Yuan et al., 2011). The best delivered VfM does not correspond to the lowest start-up cost but VfM is defined as the optimum combination of whole life cost and quality to meet user's requirements. (Coulson 2008, Barutha 2016). In 1992, UK Conservative Government introduced the Public Finance Initiative (PFI). The focus was to reduce the Public Borrowing Requirement. Yet in 1997, when Labor government was elected, PPPs shifted the emphasis to the VfM through risk allocation (Davies, 2008). PPP markets in developed countries have since matured and private investors now have full confidence in their markets (Osei-Kyei and Chan, 2015).

The European Investment Bank (EIB 2004) suggests that PPPs are "the relationship formed between private sectors and the public often with the aim of introducing private resources and/or expertise in order to provide and deliver public sector assets and services". The Public Private Infrastructure Advisory Facility (PPIAF) in Europe provides a definition of a PPP "involves the private sector in aspects of the provision of infrastructure services of new or existing infrastructure services that have traditionally been provided by government".

PPP projects do not minimize the public sector's responsibility to improve public services, only the methodology for its provision and procurement is different. Public-private partnerships are characterized by the degree to which the public and private sectors share risks, obligations, and benefits of a project (Yuan et al., 2011). A key significant characteristic of PPP is the allocation and sharing of risk among parties (Ke et al., 2010). Performance risks are usually allocated to the party best able to manage or mitigate them (Leiringer, 2006). The main objective of PPPs is to effectively manage project risks, reduce public sector administrative costs, solve the problem of public sector budgeting constraints, provide higher quality public products and services, and save time delivering them (Yuan et al., 2010).

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According to Deloitte Research (2006), a variety of new and innovative PPP models have been developed to address various challenges posed by public-private partnerships in specific conditions and sectors. These models include Alliance, EPC, Competitive, Partnership, Incremental Partnership, Integrator and Joint Venture. The challenge for the public sector is to ensure that it possesses the necessary information about its infrastructure and service requirements.

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be a key determinant in the choice of the model. Egyptian models for PPP projects use private developer scheme or conventional procurement.

Performance measurement and management are not new concepts. Performance measurement has probably existed, in some forms, as long as management has been exercised. If historic investigations are undertaken, it might be able to link performance measurement of the management activities in earlier civilizations like the Egyptian, and others. Neely et al. (2002) stated that if there is no measure, there will be no improvement. Measuring performance is not an easy mission and usually faces the problem of different operating levels in the organization. De Wit (1988) stated that it is still difficult to know how to measure project success since project participants identify success or failure in different ways. Lim and Mohamed (1999) indicated that project's success should be measured from the different perspectives of the individual client, developer, contractor, end user, and the public. PPP projects have different phases and different stakeholders need to measure performance. They should specify the level of project success and achievement of its targets (Hodge and Greve 2001).

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The origins of Key Performance Indicator can be traced to 1976 in an article published by BusinessWeek. The Centre of Construction Innovation for Constructing Excellence defines KPIs based on each single word forming the KPI terminology; "key" means define when a project is successful, "performance" means how the success is demonstrated, and "indicator" means how to measure the success. Performance indicators have been described as potential effectiveness attributes to measure overall effectiveness of PPP projects (Yuan et al., 2011).

PPP research in Egypt is very minor in the area of critical success factors (Carter and Chan, 2015) and nearly missing in area of PPP performance measurement. As a result, there is a missing standard method of assessing PPP project performance in Egypt, and the lack of historical performance data, there is no PPP benchmark. The main aim of this research is to provide a roadmap to assessing performance of PPP projects in Egypt from the concessionaire company's point of view. The detail works, including identifying the key characteristics of PPP projects, classifying and prioritizing the key performance indicators for PPP projects especially in Egypt.

### 3. RESEARCH METHODOLOGY

For continuous improvement, it is necessary to design a measurement system with strong performance indicators with capabilities to measure the performance as supporting short and long-term strategic planning for the organization. The performance measurement system is not a matter of selecting the right measures but implies a major change in decision-making processes and learning approaches implemented within an organization.

In order to achieve the aim and objective of this research, research methodology consisting of the following steps:

- Study Public Private Partnership projects and the development of PPP in Egypt
- Investigate how the PPP projects performance could be measured from the concessionaire company's point of view.
- A Questionnaire and interviews with PPP experts are conducted to identify the most important indicators.
- Use reliability analysis tests to check the internal consistency and reliability of the results.
- Develop a set of key performance indicators to measure the concessionaire company's performance in Egypt by using the weighted average mean technique.

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The results presented in this paper are expected to enlighten governments in developing countries, especially Egypt, to fully adopt the PPP performance evaluation system from different stakeholder's perspectives which will control and enhance its future performance.

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#### **4. PUBLIC PRIVATE PARTNERSHIPS - EGYPTIAN PERSPECTIVES**

The level of a country's economic achievement is directly correlated to the adequacy in the country's public services. Developed countries have established infrastructure and are ready to further modernize them, but this is not the case of developing countries like Egypt. They are lacking far behind developed countries and are generally faced with great difficulty to barely suffice basic infrastructures such as health and education. As a result, public services in these countries, along with their economic performance, are relatively poor. Each country takes its own path to developing infrastructure PPPs.

PPP projects as a concept has a long history in Egypt starting from the Suez Canal project in 1859 (De Lemos et al., 2000). With the world tendency towards these projects, in 2006 the Government of Egypt (GoE) adopted a new long-term policy of partnership with the Private Sector to offer a new source of investment capital and financing required for infrastructure projects. Other goals were to reduce sovereign borrowing associated risks and reduce the burden on the budget without prejudice to State control and possession of such facilities, during the operation period and even revert back to the State at the end of the contract. The GoE established, PPP central unit acts as a "Centre of Expertise" invested with the mission to introduce and communicate the Public Private Partnership model to develop practices and to take a vital role in the delivery of the initial projects.

GoE issued Law no. 67 – 2010 and its Executive Regulations for Partnership with the Private Sector which states tender procedures and the main clauses of the contract between the government & private sector. Through the PPP Central Unit many large projects were contracted or went under tendering/feasibility studies. Another Egyptian model was established by the Ministry of Housing and Urban Community, for providing infrastructure services through development companies to construct communities. The developer manages, constructs and is responsible for the project marketing. The Urban Community shares the revenue and agreed percentage of the project built area. It became the general contractor especially in new cities such as New Cairo and New Administration Capital.

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#### **5. PPP PROJECT'S KEY PERFORMANCE INDICATORS**

Many of the completed PPP projects have been pronounced as successful. The question is how effective or how beneficial are these projects? Do they meet the performance requirements? How are they valuable to stakeholders? How is PPP performance evaluated, in terms of project characteristics, financial and marketing, in terms of cost, time and learning, stakeholder and process indicators? For PPP projects already completed or in the operational phase or for those in progress, there is a need to investigate the key performance indicators that will measure and enhance their performance. It is important to define indicators that characterize them and that has more influence on the project success (Success Factors). These indicators, which depend on the objectives of each project, should be the basis of evaluation, since they allow comparing actual performance with the planned, of effectiveness, efficiency and quality. These indicators are useful tools for performance management.

During the life cycle of the PPP projects, performance may be change, due to various factors influence. Some of these factors are static which would be traditionally fixed at the beginning of the projects. The other factors are dynamic process-based which will be influenced by external environment or internal operational factors and will further influence project performance (Haponava and Al-Jibouri, 2011). PPPs always stress on VfM and infrastructure, therefore the factors that influence the performance of PPP projects would be more complicated than traditional construction activities, which should consider the interplay of static and dynamic factors and the benefits of different stakeholders to achieve VfM.

Public Private Partnership projects are different from normal construction projects due to the presence of the concession company as the financier. Many studies investigate the KPIs for PPP projects, Ismail (2009) developed a study to define and prioritize the KPIs in Malaysia. For monitoring the PPPs project in Nigeria, Adenitis et al. (2011), defined fifteen KPIs based on surveys submitted to various entities involved in projects that compare with this contracting model. Yuan et al. (2011), select 48 KPIs based on his research to measure PPP projects' performance and he grouped them in five KPI's group. Based

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studies, Public Private Partnership projects' KPIs are classified into three main categories:

- **Operational KPIs:** are intended to monitor the performance of the project during the operation phase
- **Functional KPIs:** serve to monitor the performance of the PPP and are classified into the economic component, social, environmental, learning and innovation, political and legal
- **Professional KPIs:** are intended to monitor the performance of the professionals involved in project e.g. engineers, architects, surveyors, contractors and suppliers

Many studies were done before to measure the performance and define the KPIs for both the design and professional phases (Torbett et al. 2001, Budworm 2001, Molenaar and Navarro (2011).

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For operational KPIs, majority of performance studies give special attention to the construction phase. It is the most critical phase and includes the majority of the projects and difficulties during the project life cycles. Many studies conducted to establish a framework of construction project performance measurement and define the required sufficient KPI's. A separate study was prepared by the authors of the most important for construction projects taking into consideration the organization size (Small – Medium – Large) and type of projects (Heavy Civil – Industrial – Building). The output was models to evaluate the overall project performance.

Functional KPIs is the main objective of this study through defining the functional KPIs and ranking them according to the survey results. These 52 KPIs are a summary of the literature review of PPP projects and what proposed by the researchers and PPP experts during the pilot study. Figure 1 depicts the six main categories (Economic, Environment, Political, Legal, Social, and Innovation and Learning) up to compose the list of the considered 52 functional KPIs.

## 6. QUESTIONNAIRE DESIGN OF KPIS FOR PPP PROJECTS

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A questionnaire was designed to evaluate the performance or success for PPP projects of the development company or what named in these types of projects "the concessionaire". The questionnaire titled "Questionnaire to develop a series of Key Performance Indicators (KPIs) to Measure Performance of Egyptian Public Private Partnership projects (PPP)". The structure of the questionnaire consists of three parts; the first contain personal information, the second collect information about the organization and the third present KPIs which are required to identify their priorities.

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A pilot study was carried out among Five PPP professionals. All of them had a good knowledge in construction management. Individual meetings held to measure the knowledge and identify any ambiguities and measure the required time to respond. The questionnaire final forms, was issued after considering all the findings of the pilot study.

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## 7. QUESTIONNAIRE FINDINGS AND RESULTS ANALYSIS

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60 questionnaires were received out of a total of 98 distributed (61.2%), which is a percentage of such type of questionnaires which need a certain level of experience in Public Private Partnership projects. The sample of respondents represents 19 organizations. The results were tabulated and analyzed as follows:

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### 7.1. The Respondents Data

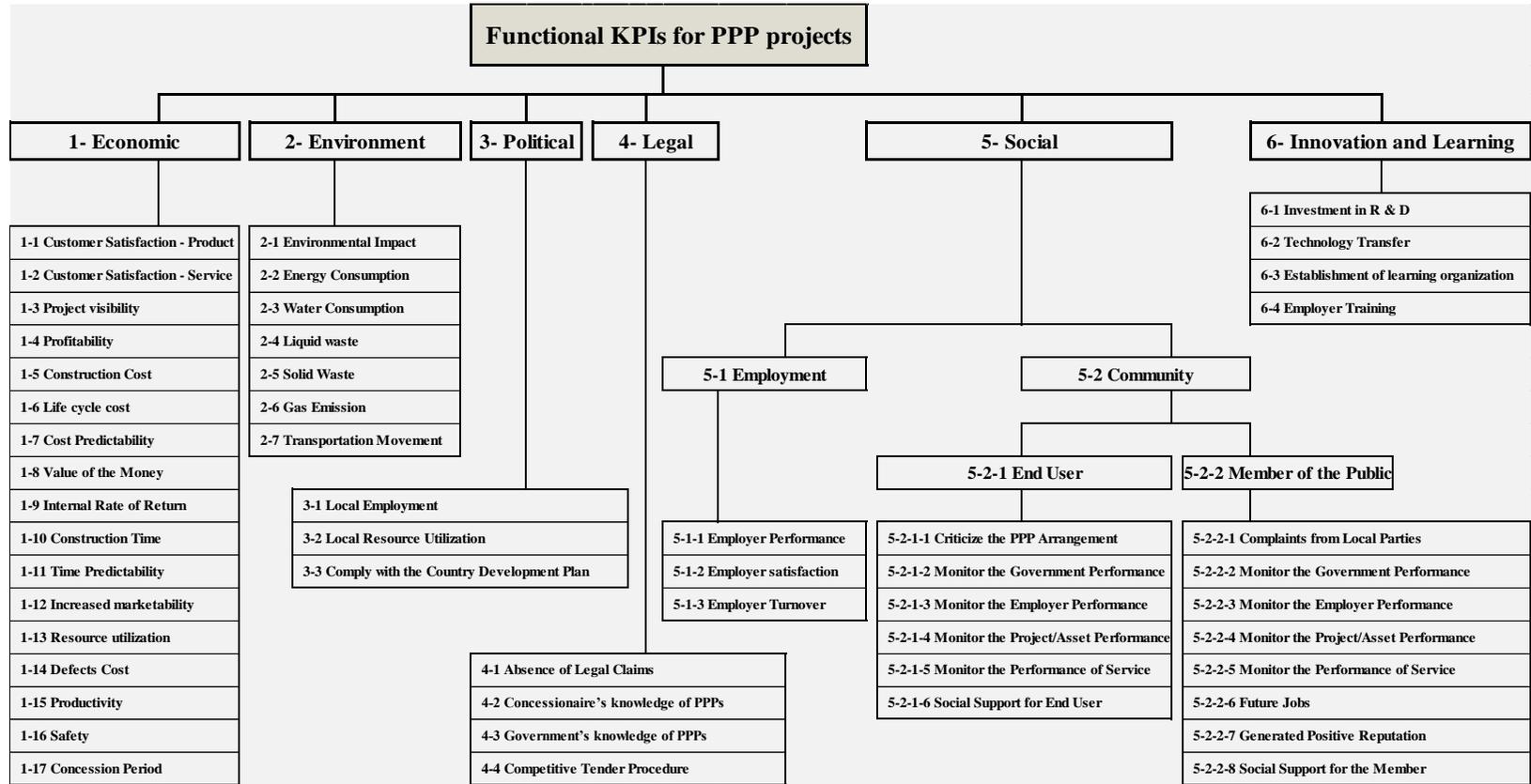
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Figure 2 illustrates the working positions of the respondents. The results showed a tendency of the respondents to be from managerial positions. 52.0% of respondents were between team leader up to director/general manager. The respondents overall had a high level of education and academic studies. 32.0% of the total sample having a post-graduate up to a PhD.

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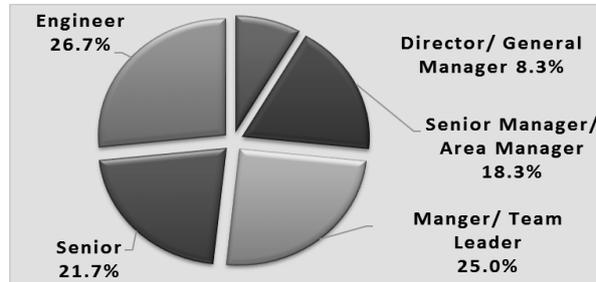


**Figure 1: Sub-Categories and Components of the Function Key Performance Indicators for PPP projects**

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The results also show that 67.4% of the respondents have more than 10 of ex and 39.6% of them have more than 16 years of experience in PPP and constructio These measurements confirm that the respondents come from high levels of experien field of construction along with the having experience in the different phases of PPP p



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Figure 2: Work positions for the questionnaire respondents

## 7.2. Organization and PPP Project Data

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The majority of the questionnaire respondents were from construction contractor co which are expected because concession companies in Egypt are usually large cc companies. Those companies usually represent the private partner in PPP projects. depicts the role of respondents' companies in the construction field.

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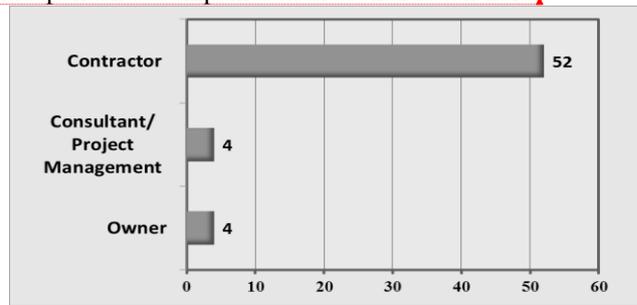


Figure 3: Respondent's Companies current role in the construction field

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## 7.3. Average Yearly Organization Revenue and Number of Employees

The average yearly revenue of respondents' organizations is one of the criteria categorizing the company sizes in small, medium and large organizations, 58.6% respondents coming from an organization with yearly revenue of more than \$100 Another indicator also used in classifying the organization size is the number of em 80% of the respondents work in organizations of more than 500 employees. Both res that the most of the respondents are from large organizations which are suitable projects' nature.

## 7.4. Use KPI in the Organization

76.7% of the respondents confirmed the use of KPIs in their organization. T percentage is seemingly reasonable as most of the companies which dealing w projects are large organizations and would have its own system for measuring perform

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### 7.5. PPP Project Type

Figure 4 illustrates that more than 78% of the respondents have experience in study, execution of PPP projects through infrastructure and energy projects. The remaining experience, either in Egypt or other international experience, in other PPP projects transportation, education, health and other. The major PPP projects executed in construction in Egypt come from public infrastructure and energy projects.

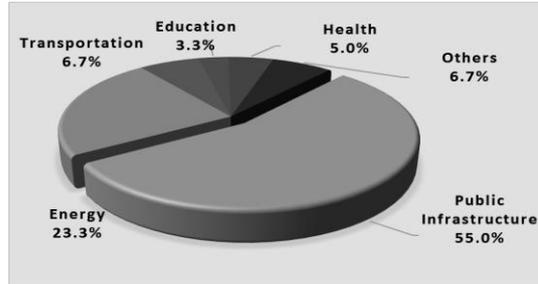


Figure 4: PPP project classification based on respondent's experience with PPP projects.

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### 7.6. Project Concession Period

Based on the respondents' experience, concession period ranged between 10 years to 21 years with the peak being between 15 – 20 years. The small percentages of other periods are due to the fact that some of the respondents worked before in other countries than Egypt, and other countries were the sole source of their experiences in PPP projects. Figure 5 depicts the preferred concession period, according to survey results.

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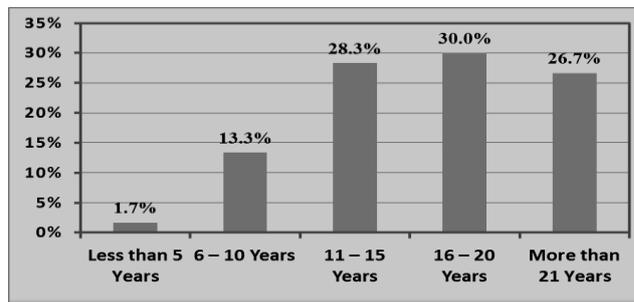


Figure 5: PPP Projects Concession Period

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## 8. Consistency of Survey Data

Statistical Package for Social Sciences (SPSS) was used to check the survey result reliability analysis test. The reliability analysis using Cronbach's alpha model was used to measure the reliability of the data set. The Cronbach's alpha values range between 0.70 and 1.0, where an alpha value greater than 0.70 is considered acceptable. The Cronbach value of the survey data is 0.951 ( $F = 4.4$ ,  $sig. = 0.00$ ), which is above the acceptable 0.70. This value signifies a good internal consistency and reliability of the research data.

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### 9. Determination and Prioritization of PPP Project KPI's

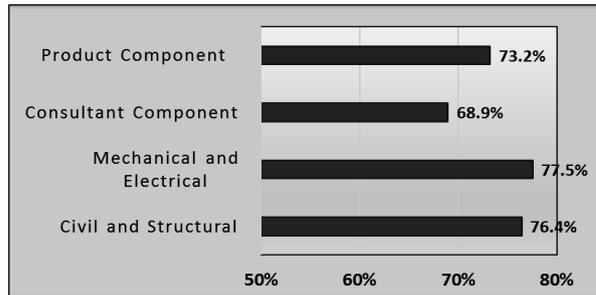
The determination and prioritization of the KPIs is very important to develop proposed KPI system for PPP. These two targets are extensively achieved through this part questionnaire analysis. This part concentrated on functional KPIs which monitor the performance that affects the project's purpose and function. Also, has become the govern main concern which includes the interests of various project parties. Before goi details of the functional KPIs, here is a summary of the results of the other two gr PPP KPIs.

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For professional KPIs, figure 6 shows that mechanical and electrical components first prioritization of the professional KPIs with a total score 77.5% followed with tl and structural components. In Egypt, like most countries, the most difficult part of p execution is the electromechanical work. This difficulty pushes the respondents to g mechanical and electrical component the most important rank. The product com namely manufacturer, supplier etc., is the third choice.

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Figure 6: Rank the main Categories of Professional KPIs

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Figure 7 depicts the rank of operational KPIs which is the third sub-category of the K PPP. Construction component gets the highest rank of operation KPIs componen construction components are chosen as the second preferred component; the third pl given to post-construction component. Authors have another study for the most im KPIs for construction projects in Egypt taking into consideration the organization s type of project. The output was seven assessment models to evaluate the overall performance.

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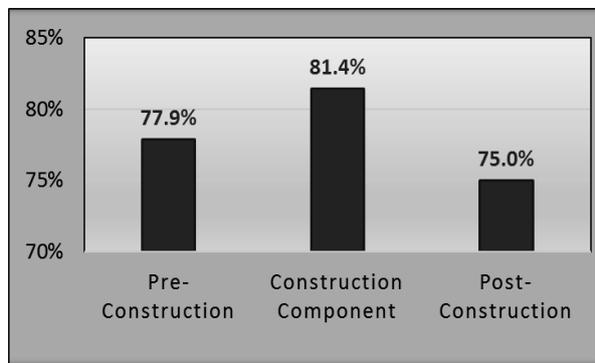


Figure 7: Priority of the main categories of Operation KPIs

PUBLIC PRIVATE PARTNERSHIP PROJECTS: CONCESSIONAIRE PERFORMANCE MEASUREMENT

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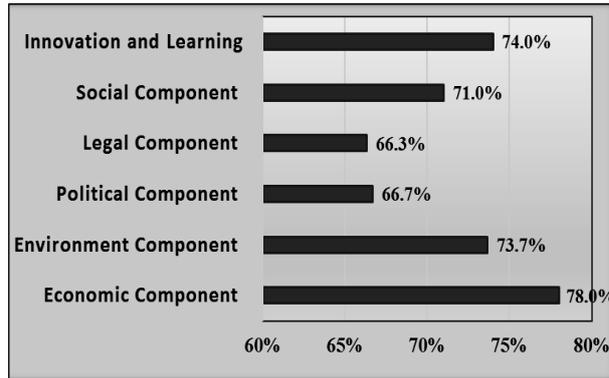
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According to the survey results, the most preferred sub-category of functional K shown in Figure 8, is the economic which monitoring the effects of PPP proj monetary issues, followed with Innovation and learning. The environmental sub-ca get the third ranking, followed by the social sub-category monitoring the effects projects on the society and finally legal and political sub-categories.

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Figure 8: Prioritize the Main Categories of Function KPIs

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One of the results which indicate a high awareness among the respondents is the ranking of innovation and learning KPIs as one of the major measurements of the project success. Employer training gets the high score of this sub-category, followed by establishment of learning, organization, and technology transfer. In prioritizing the various environment sub-category components, the highest ranking is placed by the consumption, followed with whole life impact, environmental impact.

Table 1, illustrates the method used in calculating the overall factor used in assessing components of the six sub-categories. As the economic sub-category gets the first 100% overall factor was assigned to economic sub-category and relative percentage calculated for the other five sub-categories based on percentage of every sub-category economic percentage. The same method used to calculate the relative percentage components of social sub-category. Overall factor used to calculate the relative score function KPIs.

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Table 1: Overall Factor for Function KPIs Components

Sr.	Functional KPI Sub-Category	%	Relative Percentage	Components	%	Relative Percentage	Overall Factor
1	Economic Component	78.00%	100.00%				100.0%
2	Environment Component	73.67%	94.44%				94.4%
3	Political Component	66.67%	85.47%				85.5%
4	Legal Component	66.33%	85.04%				85.0%
5	Social Component	71.00%	91.03%				91.0%
5 - 1				Employment	67.1%	95.4%	86.9%
5 - 2 - 1				End-user	70.4%	100.0%	91.0%
5 - 2 - 2				Member of the public	65.7%	93.4%	85.0%
6	Innovation and Learning	74.00%	94.87%				94.9%

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Table 2, below, lists the priority of functional KPIs components while considering overall score based on the relative weight of the sub-categories and its components. F

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Table 2: The overall ranking for Functional Key Performance Indicators for PPP pr

KPI Code	Category	Key Performance Indicators	Score	S. D.	Relative Score	Rank
1-1	1- Economic Component	Customer satisfaction on Product	3.98	0.98	79.7%	5
1-2		Customer satisfaction on Service	4.32	0.60	86.3%	1
1-3		Project Feasibility	3.90	0.86	78.0%	6
1-4		Profitability	4.02	1.08	80.3%	3
1-5		Construction Cost	3.90	0.93	78.0%	6
1-6		Life cycle cost	4.12	0.80	82.3%	2
1-7		Predictability of design and construction cost	3.63	0.80	72.7%	12
1-8		Value for Money	4.00	0.86	80.0%	4
1-9		Internal Rate of Return	3.72	0.98	74.3%	11
1-10		Construction Time	3.77	0.93	75.3%	10
1-11		Time Predictability	3.55	0.85	71.0%	15
1-12		Increased Marketability	3.22	1.04	64.3%	33
1-13		Resource utilization	3.62	0.99	72.3%	13
1-14		Defects Cost	3.37	0.96	67.3%	22
1-15		Productivity	3.88	0.78	77.7%	8
1-16		Safety	3.85	0.97	77.0%	9
1-17		Concession Period	3.38	0.98	67.7%	20
2-1	2- Environment Component	Environmental Impact	3.68	1.03	69.5%	18
2-2		Energy Consumption	3.73	0.99	69.8%	16
2-3		Water Consumption	3.65	1.05	67.8%	19
2-4		Whole Life Impact	3.52	1.05	65.8%	27
2-5		Liquid waste	3.30	1.00	62.4%	38
2-6		Gas Emission	3.37	1.09	62.4%	38
2-7		Transportation Movement	3.35	1.01	62.7%	37
3-1	3- Political Component	Local Employment	3.58	0.81	60.7%	44
3-2		Local Resource Utilization	3.58	0.85	61.4%	42
3-3		Comply with the Country Development Plan	3.92	0.96	66.5%	26
4-1	4- Legal Component	Absence of Legal Claims	3.58	0.98	60.4%	46
4-2		Concessionaire's knowledge of PPPs	3.80	0.99	63.8%	35
4-3		Government's knowledge of PPPs	3.77	0.93	63.5%	36
4-4		Competitive Tender Procedure	3.57	1.05	59.8%	47
5-1-1	5- Social Component	Employer Performance	3.75	0.77	65.2%	31
5-1-2		Employer satisfaction	3.82	0.98	67.0%	23
5-1-3		Employer Turnover	3.70	0.83	64.2%	34
5-2-1-1		Criticize the PPP Arrangement	2.97	0.74	58.5%	52
5-2-1-2		Monitor the Government Performance	3.43	0.81	62.4%	38
5-2-1-3		Monitor the Employer Performance	3.55	0.87	64.4%	32
5-2-1-4		Monitor the Project/Asset Performance	3.53	0.91	65.3%	28
5-2-1-5		Monitor the Performance of service	3.90	0.95	71.2%	14
5-2-1-6		Social Support for End User	3.58	1.08	65.3%	28
5-2-2-1		Complaints from Local Parties	3.37	0.66	57.4%	51
5-2-2-2		Monitor the Government Performance	3.47	0.89	58.3%	50
5-2-2-3		Monitor the Employer Performance	3.62	0.85	61.3%	43
5-2-2-4		Monitor the Project/Asset Performance	3.63	0.86	62.2%	41
5-2-2-5		Monitor the Performance of service	3.83	0.87	65.3%	28
5-2-2-6		Future Jobs	3.55	0.93	59.8%	47
5-2-2-7		Generated Positive Reputation	3.60	0.94	60.7%	44
5-2-2-8		Social Support for the member	3.53	0.89	59.8%	47
6-1	6- Innovation and Learning	Investment in R & D	3.58	1.03	66.7%	24
6-2		Technology Transfer	3.55	0.91	66.7%	24
6-3		Establishment of Learning Organization	3.55	0.87	67.4%	21
6-4		Employer Training	3.67	0.84	69.8%	16

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the components of economic sub-category which is consisting of seventeen Indicator get the first rank of the six Functional KPIs sub-categories, the components of economic sub-category get the first 10<sup>th</sup> places of overall assessment of functional KPIs ranking. The first KPI is customer satisfaction on service, followed by the life cycle cost, profit value for money and customer satisfaction on product.

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## 10. Validation of Results by PPP Experts

The Final step was results validation by PPP experts. According to researches, four to six experts are considered sufficient for validation (Cheung, For this research, six experts not participated in pilot study or questionnaire survey chosen. Experts should have knowledge and experience in different areas including KPIs as well as different procurement approaches and evaluation techniques. The of this interview is based on evaluation of questionnaire survey resulting which was to them earlier in order to have a general view and a clear idea about the subject and the benefit of meeting. All of the experts agreed that the list of KPI indicators is simple and sufficient to be implemented in assessing the performance of PPP project concessionaire. Nevertheless, two experts claim that the indicators are too extensive seeing as the PPP in Egypt is still in its early stages and the issue needs to be simplified at this point. The experts still trust that the KPIs for PPP have a very significant potential to support the Egyptian government and PPP central unit in monitoring the concessionaire performance and subsequently restructuring the Egyptian PPP evaluation models. The experts also claimed that the function of every KPI in measuring performance is not obviously specified. The researchers stated that all KPIs functions are clear and direct interpretation of the components itself and the short description provided to the researchers in questionnaire also. It was agreed, no major changes are required.

One from expert suggests that the Likert scale should be classified in different categories according to the nature of KPIs, for example, components of environmental category are inaccurate to be scaled as “1 = poor” to “5 = excellent”, yet should be classified as “1 = highly impacted” to “5 = highly not impacted”. Another expert proposed that Likert scale is better to be scaled from “1 = poor” to “4 = excellent” to avoid the behavior of respondents in neutral performance evaluation, precisely “3 = neither poor nor excellent”.

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Another suggestion for improving KPIs implementation, experts propose that KPIs for PPP can be transformed into an interactive model which can easily calculate performance results achieved by the concessionaire. This model should also be able to conclude the performance, excellent or poor, and ultimately suggest whether a performance reward should be respectively imposed or awarded based on the performance output. The model need to be flexible enough to accommodate any other KPIs indicators or to remove unnecessary KPIs for different projects' type. This flexibility will allow this KPIs system to be implemented in evaluating the performance of other types of projects provided with other procurement approaches. Actually, many developed countries have KPIs systems to record of construction project output. This issue may be extending to issues of subcontractors' classification certificates based on assessing their performance by KPIs.

One of the experts claimed that a PPP project deals with end users when the product or the output of the project can be provided directly to the end users, such as a health project or hospitals. On the other hand, in the case of a water treatment plant, sewage treatment plant or power plant; the project output will be part of the overall service provided by government and provided indirectly to the users. In this case, one of the public could be used. The reply was in both cases, one of the public could be used.

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Finally, it can be declared that the establishment of KPIs for PPPs is feasible and can be applied to Egypt's construction industry for the assessment of concessionaire performance. Regular monitoring, observation and strict implementation should ensure the success of the KPIs for PPP in Egypt.

## 11. SUMMARY AND CONCLUSION

The increasing demand for quality public services is clear in many countries around the world. There are incredible changes happening to the government's approach in providing infrastructure to the public, as the world is facing challenges of modernization, globalization and restructuring of national economies. The public private part

## PUBLIC PRIVATE PARTNERSHIP PROJECTS: CONCESSIONAIRE PERFORMANCE MEASUREMENT

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provides competitive and transparent mechanisms to pursue opportunities that together the ideas, experiences and skills of both sectors, and develop creative solutions to meet a community's needs, expectations and aspirations.

Egypt is moving more seriously into using the partnership with the private sector in many projects and areas to offer a new source of investment capital and financing, reduce sovereign borrowing and associated risks, and reduce the burden on the budget. One of the major difficulties to promote improvement in construction companies is the lack of quantitative performance measurements. This evaluation is required to identify and measure performance in a quantitative manner from many perspectives, not only the financial and profitability points of view. Also, measuring performance helps an organization to identify the areas that require attention and improvement, give a chance to take the necessary corrective actions or improvement plans. A questionnaire survey was conducted to identify the most important key performance indicators for PPP projects. With 60 responses received, prioritization of KPI areas has been satisfactorily instituted. The research will contribute to improving the existing but limited knowledge of PPP performance measurement in developing countries, especially Egypt, by providing a framework for selecting KPIs to measure the PPP concessionaire performance. It is expected that government and policymakers adopt an evaluation system for concessionaire selection based on their recorded performance. The following are the findings and conclusions of this research:

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- KPIs for PPP projects are classified to three main categories which are functional, operational and professional.
- Economic sub-category gets the first rank of prioritizing functional KPI categories, followed by Innovation and learning. Environmental. sub- category gets the third ranking, followed by social KPIs.
- Customer satisfaction on service gets the highest rank of overall assessment components of functional KPIs. The second rank of importance was given to life cycle cost, followed by profitability.
- Mechanical and electrical components get the first prioritization of the professional KPIs followed by the civil and structural (C&S) components.
- Construction components represented the highest rank of operational KPIs
- Expert interviews concluded that incorporating KPIs on PPP is feasible to be implemented in Egypt, at least partially right now and fully later. Consistent monitoring, an implementation should be performed to ensure the success of KPIs for Egyptian projects.
- KPI's could be used by the Egyptian PPP Central Unit to rank Egyptian companies like many developed countries do, which considers performance as the main basis for a contractor's evaluation which will give a positive impact on using KPI's in Egyptian companies. The implementation needs a strong system to collect performance data of all companies and issue periodically, classification manual on companies' performance.
- The overall results prove that the awareness of the construction players has developed from achieving the required profitability only, to sustaining environment and social where the environmental have been prioritized as the third sub-category functional KPIs. The same is also shown for innovation and learning, including component technology transfer which gets the second rank.

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Future work on key performance indicators based on this work is creating pre models to anticipate the performance of PPP projects based on the results measured during the phase of the project life cycle.

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