Socio-Economic Performances of Mega Construction Projects (MCPs) in the Light of Sustainable Development of Nigeria’s Built Environment

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Abstract. MCPs encompasses “Infrastructure development projects (IDPs)” such as skyscrapers, mega-shopping complexes, large public transportation projects, power plants, oil and natural gas extraction projects, bridges, tunnels, seaports, large-scale sporting facilities water and dams, power supply and urban development projects. Such projects characterized by strategic importance, dynamic complexity, adaptability and extensive impacts. Such combinations make them inherently vulnerable to crises. As a developing country, Nigeria is facing some fundamental challenges that need attention before it can fully realize its economic potential due to its size, population and resources. This paper examines the socio-economic performances of MCPs in the light of sustainable development with the view to identify and assess such performances from the project professionals’ perspectives’ working in Nigeria’s built environment. The literature reviewed led to the identification of 16nr. SEP impact factors of MCPs; forms the backbone of the questionnaire. These SEP factors and their related impacts brought about by MCPs in Nigeria assessed and the results show they were significant as they aid the sustainable development of the overall country and its citizens socio-economically. These altogether shapes the overall sustainable development of a developing country like Nigeria.

1. Introduction
Mega Construction Projects (MCPs) are large construction projects that are captivating to political leaders and the public because of their colossal size and the technical hurdles they overcome [1]. Such projects include high rise skyscrapers, mega-shopping complexes, large public transportation projects, power plants, oil and natural gas extraction projects, bridges, tunnels, seaports, large-scale sporting facilities water and dams, power supply and urban development projects [2]–[4]. Wang and Pitsis [5] also added that MCPs are projects being characterized by strategic importance, dynamic complexity, adaptability and extensive impacts. Such combinations make them inherently vulnerable to crises. Also, Qi Wen et al., [6] linked such challenges to continuously changing project environments for MCPs, and the organizations handling the MCPs. Such organizations need to not only make the right decisions but also make decisions on time. MCPs are the backbone and instruments for infrastructural development.
in any country as they encompass “Infrastructure development projects (IDP).” Generally, infrastructures is the set of interconnected structural elements that provide framework supporting an entire structure of development [7]: systems, and facilities serving the economy of a business, industry, country, city, town, or area [8]; it includes the services and facilities necessary for an economy to function [9]. They are costly ‘technical structures’ and projects such as roads, bridges, tunnels, railways network, or other constructed facilities or components of water supplies, sewers, electrical grids, telecommunications, and so forth [9][10]. Frick [11]; characterizes MPs with the term “Six Cs,” meaning Colossal, Captivating, Costly, Controversial, Complex, with Control difficulties. These underline the relevance of infrastructure as MCPs for the overall development of a country.

Nigeria is a developing country located in West African and the continent’s largest economy, Nigeria has undergone many changes in recent years. Some fundamental challenges are remaining and needing attention before it can fully realize its economic potential [12]. These entail taking advantage of the population with its demography, political, social and the available natural resources as the potentials into the economic plans and policies to effect sustainable growth and development. Because, every population growth comes with its prospects, needs, and challenges, especially on the existing and future infrastructure. According to the Global Infrastructure Outlook report as cited by [13], Nigeria’s annual average public investment in infrastructure across the sectors of transport (rail, roads, airports and ports), energy, telecommunications and water between 2007 and 2017 was equivalent to about 3.6% of GDP and did not surpass 4.6% of GDP in any given year during that period. Investments in transport infrastructure positively influence gross domestic product per capita for every form of transport, apart from inland waterways, though it comes with environmental pollutants such as CO2 emissions [14], thereby reducing any hindrances [15]. Balogun [16] opined that when it comes to infrastructure development in Nigeria, it is better late than never. There is a paradox here; however, at the same time, as many more and much larger infrastructure projects are being proposed and built around the world; it is becoming clear that many such projects have strikingly weak performance records in terms of economy, environment, and public support. Cost overruns and lower-than-predicted revenues frequently influence project viability thereby pushing the risk limits to be higher and unacceptable. These also redefine projects initially promoted as capable vehicles to socio-economic growth as possible obstacles to such growth. Some may argue that the overruns (cost and time) do not matter and that most monumental project that excites the world’s imagination had large over-runs. This line of argument is too facile, however. The physical and economic scale of today’s megaprojects is such that whole nations may be affected in both the medium and long term by the success or failure of just a single project from the economic, environmental and political support such projects initially enjoyed[17]. MCPs are viewed differently and subjectively, as each stakeholder views it from his perspective, from the government, the sponsors, the project team, the contractors, the end-users and especially the host communities where the MCPs were cited. Hence, this paper examine the socio-economic performances of MCPs in this era of environmental sustainability; with the view to identify and assessed such performances from the construction project professionals perspectives’ working in the Nigeria’s built environment.

2. Socio-Economic Performances of MCPs & Sustainable Development in Nigeria

Nigeria is the 7th most populous country in the world and the largest oil producer in Africa [18], [19]. Despite these strong fundamentals, Nigeria has found it challenging to convert her unique advantages into economic and social benefits for the majority of her citizens. While the political environment is improving with successful handovers within its democratic system, the instability of oil prices has affected the federal government’s revenues, of which oil revenues used to be about 75% - 85%. This makes diversification of the economy a top priority; this will require considerable investments in infrastructure and the Nigerian government has identified this as a major priority by increasing the capital expenditure to over 30% of the total annual budgets from 2016 - 2019 compared with 11 - 22% in the previous year’s annual budget up to 2015 [16], [20]. The intention is to bridge the infrastructural deficit and ensure sustainable development. Infrastructure development, by extension, MCPs, is a continuous process affecting various levels of socio-economic development [21]. Social and economic
impact or performance refers to the effects of an activity, action, business operations, market trend, program, policy or project on the economic and social well-being of a society which may be positive or negative”. The particular area of interest here is the MCPs in Nigeria [22], [23].

MCPs leading to socio-economic development in most cases are beyond the capability of the local construction industries to undertake, owing to the size, novelty, and complexity of those projects [24]. These have increased foreign participation in the construction industries of most developing countries [24], [25]. The requires involvement of foreign companies to undertake MCPs. Their engagement is expected to develop the skills of the local professional as [26] noted that both domestic and international construction firms benefit if systematic efforts are made by the latter to develop the former. Ofori [21] asserted that developing countries have no option than to import some construction activities and technical knowledge to execute such projects. These lead to an influx of foreign workers thereby limiting employment chances and the cultural difference has a significant impact on projects and their management [21], [27], [28]; while it also requires cognizance of local cultures, labor, statutory laws and regulations which affects the overall MCPs performances. Such projects leading to efficient infrastructure attracts centres of production and consumption, gives greater access to markets, education and health centres [29]; improves social amenities, services, and liveability in residential areas, recreational and sports facilities [30].

MCPs in developing countries like Nigeria are labor-intensive; employ of millions of workers directly and indirectly [31] leading to regular salaries or irregular wages as the case may be. Such affects the amenities, lifestyle, comfort and safety of communities due to air quality, noise, visual pollution or increase in traffic levels[30]. MCPs like new industrial areas or Airports limit certain kinds of developments such as residential development in surrounding areas [32]; This is similar to Hydropower projects which also leads to the resettlement of communities and other facilities [33]. However, the energy generated by such projects boosts industrial activities with profound socio-economic effects such as agricultural irrigation with food production, urban water supply, tourism and flood control, [34][35]. MCPs in transportation sectors such as Roads, Rail, and Aviation projects contribute to social vibrancy, economic competitiveness by effecting daily movements to towns, city centres and suburbs [36]–[38]; facilitate trade; reduces friction of distance; improve mobility of people and goods; overall better standard of living and ease of social cohesion and integration; on-time deliveries; improve the customers’ expectations [39]. MCPs guarantee mass employment opportunities, ensure wealth creation, more revenue generation and provide several choices of transportations” [40], [41]. Rail projects were identified to have socio-economic impacts like “Reduction of travel time, economic efficiency, employment generation and economic growth; Social equity, increase in the use of public transportation, urban regeneration, noise control and safety” [42]. The table 1 below summarizes the socio-economic performances (SEPs) of MCPs in Nigeria based on the literature reviewed.

### Table 1. Socio-Economic Performances and Impacts of MCPs in Nigeria.

| S/N | Socio-Economic Performances (SEP) and Impacts of MCPs in Nigeria. | Roads & Rail Projects | Airport Projects | Dams, Hydro, Power & Water projects | ICT, Residential & Commercial Buildings | Industrial Zones |
|-----|-------------------------------------------------------------|------------------------|-----------------|------------------------------------|---------------------------------------|------------------|
| 1   | Employment of people, directly and indirectly, due to MCPs   | ✓                      | ✓               | ✓                                  | ✓                                     | ✓                |
| 2   | MCPs Engages other sectors of the economy                   | ✓                      | ✓               | ✓                                  | ✓                                     | ✓                |
| 3   | Reduces friction of distance; Multitude movement of people  | ✓                      | ✓               | ✓                                  | ✓                                     | ✓                |
| 4   | On-time deliveries of Goods and Services to the population  | ✓                      | ✓               | ✓                                  | ✓                                     | ✓                |
| 5   | Improve the standard of living; Ease of social cohesion and integration | ✓                      | ✓               | ✓                                  | ✓                                     | ✓                |
| 6   | Increase in the ease and use of public transportation      | ✓                      |                 | ✓                                  |                                       | ✓                |
| 7   | Adequate Power Generation, urban water supply, tourism, flood control, and food production projects (Dams) | ✓                      |                 | ✓                                  |                                       | ✓                |
Altogether, these led to the formulation of the research hypothesis to ascertain the significance of the above SEPs and Impacts of MCPs. The hypothesis, thus, states, “The sustainable development in Nigeria is not significantly influenced by the socio-economic performances of MCPs.”

3. Research Methodology
Research methods and approaches vary according to various fields. In social sciences (Construction, Project Management) & cross-disciplinary sciences, it involves the collection of information[44] in a systematic, logical manner based on relationships [45] to enable better analyses and conclusions. The literature reviewed (Secondary data) led to the identification of the SEP impact factors of MCPs influencing Sustainable development in Nigeria. These SEP impact factors of MCPs forms the backbone of the questionnaire. These led to the adoption of Mono Quantitative Method (MQM) research design as a single data collection technique, based on the questionnaire, and corresponding quantitative analytical procedure. Krejcie and Morgan[46] table of determining sample size was used which fixed 384 as the sample size for a given population of 1,000,000. To allow for equal participation, the questionnaires were administered randomly to project professionals working across the Client, Consultant, Contractor organizations while also taking into consideration those in Academia and Freelancers. Both descriptive statistics (Frequency and Percentages tables) and inferential statistics (Cronbach’s Alpha for reliability; Mean Item Score (MIS); Relative Importance Index (RII); T-test statistics) were used for statistical analyses of data obtained in this study.

4. Data Analyses and Discussion of Results
The analyses of the data obtained from the fieldwork were shown in the following tables and figures. A total of 719 number of questionnaires were distributed, of which 373 number were circulated electronically with a response rate of 71% (265nr). 346 number of questionnaires were distributed manually with a response rate of 39.9% (138nr.). As such, a total of 403nr. of responses were obtained, which satisfy the Krejcie and Morgan[46] sample criteria. The overall data compiled and computed is shown in table 2 below.

Table 2. Assessing The Socio-Economic Performances & Impacts Of MCPs In Nigeria

| S/N | SOCIO-ECONOMIC PERFORMANCES & IMPACTS OF MEGA CONSTRUCTION PROJECTS (MCPs) IN NIGERIA | Mean Item Score | Remark | RII | Ranking |
|-----|--------------------------------------------------------------------------------------|-----------------|--------|-----|---------|
| SEP1 | Employment of people, directly and indirectly, due to MCPs                            | 3.68            | Very Good | 0.74 | 3rd     |
| SEP2 | MCPs Engages other sectors of the economy                                             | 3.68            | Very Good | 0.74 | 4th     |
| SEP3 | Reduces friction of distance; Multitude movement of people                           | 3.64            | Very Good | 0.73 | 7th     |
| SEP4 | On-time deliveries of Goods and Services to the population                           | 3.69            | Very Good | 0.74 | 2nd     |
| SEP5 | Improve the standard of living; Ease of social cohesion and integration               | 3.67            | Very Good | 0.73 | 5th     |
Cronbach’s alpha for reliability and consistency test was used for the above research responses obtained using the Likert Scale. The overall reliability and consistency computed have an average score of 0.85, deemed very good. The research hypothesis regarding the socio-economic performances and impacts of MCPs was tested for significance using the values obtained from the MIS model in Table 3 above.

**Table 3. Testing the research hypothesis for socio-economic impacts and performances of MCPs**

| SEF   | Mean | Standard Deviation | Standard Error | N  | DF | Alpha (level of Significance) | P-value | T-cal | Ttab0.05, 15 | Significance |
|-------|------|-------------------|----------------|----|----|-------------------------------|---------|-------|--------------|-------------|
| 16nr. SEF | 3.44 | 0.28              | 0.07           | 16 | 15 | 0.05                          | 0.00    | 48.94 | 1.75         | yes         |

Source: Author, 2019

With 15 degrees of freedom (DF) and 5% level of significance, the statistical T-test calculated (T_cal = 48.94) is greater than T-test tabulated (T_tab0.05, 15 = 1.75); the significance level (alpha-5% = 0.05) is greater than the Probable value (P-value = 0.000). As such, the null hypothesis was rejected, and the alternative hypothesis was accepted, which clearly states that “The socio-economic factors are significantly influenced by the performances of MCPs in Nigeria’s built environment.”

4.1. **The implications of Socio-Economic Performances on MCPs and their associated impacts.**

The above outlined sixteen SEP Factors based on the above assessments using the Mean Item Score (MIS) Model and The Relative Importance Index (RII) model to assess and remark each of the SEP of Mega Construction Projects (MCPs) in Nigeria indicates that there is a remarkable impact from the MCPs irrespective of the internal performances of the projects. The SEPs good performances and the impacts the MCPs have by Increasing the ease and use of public transportation that lead to on-time deliveries of Goods and Services to the population. This improve the social cohesion and integration that is vital to Nigeria’s unity in diversity. Because, Nigeria has six geo-political zones divided into the northern and southern regions that differ slightly in cultures and religions. As such, the ease of social cohesion provided by the MCPs is vital by reducing the friction of distance with the multitude movement of people; Greater access to markets, education and health centers. The MCPs enable employment of people directly and indirectly; engages other sectors of the economy thereby creating more wealth and more revenue generation for the government. Some of the MCPs were to address the Adequate Power Generation, urban water supply, tourism, flood control, and food production projects (Dams). Altogether, these improve the standard of living for Nigerians. Mega Projects come with tremendous
advantages and mega problems also. In Nigeria’s MCPs executed by foreign companies, such issues include Influx of foreign workers limiting indigenous expert jobs; these affect how the international companies take cognizance and respect the Labour Laws and Contractual agreements. Others were how the MCPs Impact social amenities and lifestyles of surroundings; limit certain kinds of developments in the surrounding areas (e.g., Airports, Sea Ports, and Dams); Smooth Resettlement of communities due to MCPs. These projects Affect Project community safety and comfort such as air quality, noise and disruption of traffic; Distrust, Discrimination and Maltreatment of Indigenous workers by foreign companies.

The overall analyses accept the alternative hypothesis for the study that indicates that the sixteen outlined SEP factors and impacts were influenced significantly by the performances of MCPs in Nigeria’s built environment and lead to sustainable development. As such, the significance and positive effects of such SEP hinge and or rely significantly on the performances of such projects executed in Nigeria’s built environment.

5. Conclusions and Recommendations

The research identified and assessed 16nr. SEP factors and their related impacts brought about by MCPs in Nigeria were significant as they aid the sustainable development of the overall country and its citizens. It also goes in line with Sohail and Baldwin [47], who opined that the benefits of MCPs for infrastructural development has traditionally been determined primarily through its utility, and within development, contexts infrastructure is seen as the key to economic growth and poverty alleviation, and to improving physical quality of life indicators in terms of health, comfort and convenience. These altogether shapes the overall sustainable development of a developing country like Nigeria. There is a need for further studies to identify and assessed other SEP factors and their impacts while also employing other performance assessment/measurement systems to specific and unique MCPs within the overall infrastructural system in developing countries like Nigeria.

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