A VISION ON FUTURE DEVELOPMENT OF BUILDING AND CONSTRUCTION INDUSTRY IN EGYPT

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ABSTRACT

The building and construction (BC) industry is a fundamental economic sector which is highly linked with other industrial sectors. Although there is a great deal of attention has been paid to building and construction processes as a part of BC industry, little consideration has been given to how can we enhance and develop BC sector and benefit from the expanding demands for building and construction projects to develop national economy.

The objective of this research is to give a glimpse of building construction future in Egypt. A great development in this sector is needed to promote socio-economic development objectives and improve industry performance and competitiveness in international market. This paper addresses some of the challenges facing the building and construction industry and related industrial sectors and shows the possible future prospects of developments which help in contributing to national economy development.

It has been concluded and recommended that encouraging the application of advanced technologies and developing innovative ideas, the building and construction industry together with related and interconnected industrial and economic sectors will help in pushing ahead national economy.

Keywords: Construction, Building, Industry, Architecture, Development.

INTRODUCTION

The contribution of the building and construction (BC) industry to economic growth and long-term national development is widely acknowledged due to its importance, particularly to developing countries. Construction industry is considered an important sector of the economy and plays a key role in national social and economic development [1-6].

The Building and construction industry is a fundamental economic sector which permeates most of the other sectors as it transforms various resources into constructed physical, economic and social infrastructure necessary for socio-economic development. It embraces the process by which the physical infrastructure are planned, designed, procured, constructed or produced, altered, repaired, maintained, and demolished [7].

Construction in general does not behave as an "industry," but more like a "conglomerate of industries," an "industry of industries, and a "meta-industry." This line of generic and structural thinking of building construction as a meta-industry and its systemic nature of building construction complexity imposes a definition as a "dynamic process." [8,9].

The building and construction industry encompasses some basic global industries, Fig. (1). These industries include, by way of example: cement industry, iron and steel industries, masonry, sand and gravel screening industries, etc..Feeding industries, on the other hand, are enormous to cover prefabricated buildings, materials, painting and finishing accessories, mechanical and electric equipments, etc. The developing of these industries is a must if we are aiming for future socio-economic development.

Construction in General is More Like a "Conglomerate" an "Industry, and a Meta-Industry"
Fig. 1- Building Construction Industry and related industries

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There are some ideas that the BC industries can benefit by learning more about the use of advanced techniques developed in the fourth industrial revolution (Industry 4.0)[10] This entails a possible compromise in applying management systems and organizing feeding industries.

The contribution of the BC industry development to the Egyptian economy should not be underestimated. Previous analyses [11-14] had enumerated the main factors which may constrain the sustainable development and growth of construction and related engineering services in Egypt. The analysis assessed the main constraints, namely financing, size of the companies, human resources, cost of doing business, impact of macroeconomic policies, institutional framework as well as export barriers. Some reform solutions could be proposed from economical point of view [11-14]. It has been shown that mega projects in Egypt are under the umbrella of building and construction industry and related industries [13]. As shown in figure 2, these mega projects include: Suez Canal (including new tunnels and the new international cities), New administrative capital city, Sinai development, One million social housing units, Creating a new 4800km of roads network, North west coast development projects, Developing the golden mining triangle, Energy development and transformation and Reclamation of one and half Million Feddan. The construction of these projects throughout the last few years helped largely in economic reform and in paving the ways to attract more local and international investments [11-14].

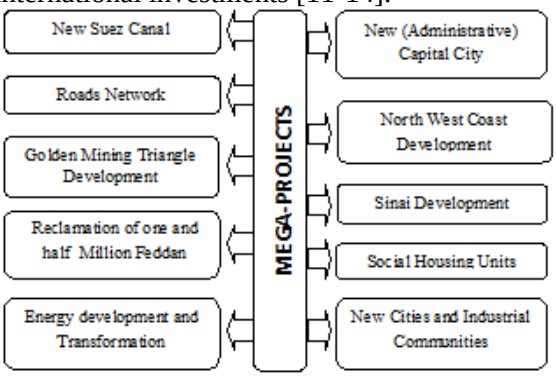

Fig.2- Mega-Projects in Egypt

Ways must be found to take advantage of the special features of construction which offer unique industrial and economic opportunities. First, the BC industry should effectively play its role in the economy by realizing its potential to create jobs in all parts of the country. Construction offers more opportunities than most other industries. Construction of each 1,000 homes equals 2,448 jobs [6]. As well, construction stimulates business activities in other sectors of the economy. Of which sectors and the most effective one is manufacturing sector. Hence, innovative strategies are necessary to make this possible. The construction industry is under a significant paradigm shift. There are a number of forces steering this shift. Among them are the fourth industrial revolution, the evolution in materials engineering, the physical construction of buildings and embedding of electronics [10, 15-17]

Building and Construction Classification

As regards BC industry, it is basically some sort of unit production product owned and managed by contractors. The innovation in construction comes in early stages of design and is followed by a technology based on mechanical and electrical engineers with the civil engineers' ideas and creation being considered. The construction activity could be internationally classified [18]. A classification with regard to type of construction [19] could also be given as such: residential buildings, nonresidential buildings and civil works; Fig. 3. Other classifications and identifications are given in different standards or references [5, 20, and 21].

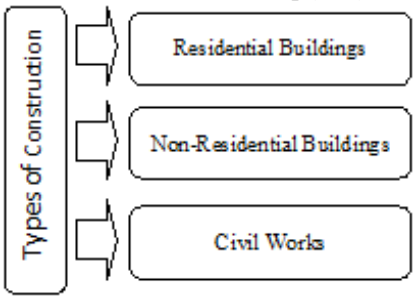

Fig.3- Basic Types of Construction

For the object of this paper the author suggests to summarize the BC industrial process into basic three stages or phases, namely: Pre-construction phase, Construction phase and post-construction phase. The first phase comes within the job of architects and civil engineers in project selection, design and documentation for project preparation. This stage entails the surveying, land reclamation, soil testing and site preparation for the next construction phase to begin.

The second BC stage is the core stage of the building and construction industry. It entails specifically, work on site, laying foundations, and framing structures and installing utility systems. Hence, this stage entails the use of heavy machinery (e. g. cranes, loaders, concrete mixers, measuring and leveling devices, equipments, supports, fixtures and others). In this stage, also a vast variety and quantities of raw materials are used. The materials in use are mainly steel in different shapes, forms and grades, concrete with types depending on site environment and construction type, mining and mineral materials, composites, wood, etc.

Add to these construction requirements another

contributing construction industry segments which include those of installing utility systems, namely, air conditioning, water piping and fittings, communication, pluming and sewage, gas, and electricity.

It is worth mentioning in this context that future innovations and applications in this stage recommend adopting prefabricated buildings in large settlements [22-25] and the future use of promising progress of innovative 3D printing in building methodology [26,27].

The major advantages offered by the prefabricated building systems when compared to conventional construction methods are reductions in cost and time, improved quality and accuracy in manufacture, speed of installation on-site, minimizing on-site noise and dust reduction of construction waste and can also be dismantled and reused [23-25]. Of interest to remark here that there is negligible attention given to prefabrication of structural and building units. Modular or prefabricated construction has been gaining international ground as an alternative building method that offers the benefits of reduced construction time, less waste and possible cost savings. This represent another field of industrial activities that should be taken into account in future manufacturing schedules and strategies; it is expected that prefabrication to be an accelerating trend next decade [16, 22-25]

Within this stage the Egyptian firms can largely play a role in enhancing and supplying the BC industry with most of its requirements. A promising economic field of activities in small and medium industries which should be encouraged to go through and to share actively in the development. Add to this, the architects, engineers and scientist should also coupe together and conduct intensive multi-disciplinary research work. This research work has to be in phase with the rapid developments in smart advanced construction techniques and its requirements in architecture design, civil and structural work, mechanical and electrical installments and applications.

The third stage implies the finishing processes which entails enormous number of activities and special products. These include, by way of example, finishing, plastering and painting, steel and aluminum works, wood works, brick and stone laying, tile and marble settings, roofs, drywall installations, sheet-metal works, and ceiling tile installations, doors and windows, fittings. etc. The variety and even simplicity in some of the products should give an alarm that the small industries should urgently be prepared to contribute effectively in manufacturing these products not only for national market but also should compete for exportation in international market especially under the international agreements and treaties.

Recommendations for BC industry development

Egypt is now on a long-term development strategy which aims to achieve sustainable human development. This envisages creation of a strong, diversified, resilient and competitive economy that can effectively cope with the challenges of development and that can easily adapt to the changing market and technological conditions. This enforced a scheme for development of infrastructure as an important ingredient towards attainment of faster economic growth. A tremendous number of planned mega-projects and public works initiatives together with housing installments mean that the BC industry is having sizeable projects within the strategy of Egyptian development plans. Large-scale plans for a new capital city and the expansion of the Suez Canal, coupled with rather important infrastructure upgrade requirements, erecting new housing settlements promise a welcomingly busy years ahead for Egypt's BC industry. This should be coupled with and go through in parallel to bush manufacturing and materials sectors to be in phase and develop to the extent to compete in national and international markets.

The development of BC industry is a must. The following recommendations could be assigned to go to main partners involved in the BC industry; namely, contractors, investors, educational and research institutes. For contractors, the use of advanced technologies in construction and building methods will ensure a high quality product with less cost. The use of advanced building methodologies will help largely in entering the international market and exporting BC experience abroad. A means which assures development and increase in national income. For investors, the investment in building and construction industry is a profitable investment. Keen selection of building type, site and architecture design with applying green smart buildings concepts will guarantee high income return. The educational and research institutes are urged to think ahead in teaching academic subjects related to advanced BC industry. Also, conducting research work on new building techniques, 3D printing technologies and BC materials would help in reducing cost and ensuring sustainable buildings. Recommendations go also to architects to apply green buildings concepts, to use prefabricated building in large settlements, to keep in phase with energy saving rules and to design a building body with geometry and materials based on futurestic technological advances. This will help largely in applying BC advanced methods and ensuring

reduced cost with high quality. Feeding industries related to BC machinery, equipments, and accessories, should also be addressed to develop to meet local and global requirements. By these awareness remarks, the BC industry will develop with a consequential development in national income.

CONCLUSION

This paper gives an insight into the awareness of the importance of Building and Construction industry to national economy. Recommendations have been given to face BC sector challenges and to develop this sector and related economic ones. Applying dynamic, professional, advanced and reliable ways for the development of building and construction industry promotes its future prospects. All BC partners are urged to take part in the development process. By encouraging BC industry to follow up recent advances and pushing ahead related industries to meet BC requirements, sustainable development and enhancement of national income can be assured. The BC industry would then be able to compete locally and internationally.

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