Requirements for Economic Sustainability in the Yemen Construction Industry

B. Sultan and S. Kajewski
School of Construction Management & Property, Queensland University of Technology, GPO Box 2434, Brisbane, Queensland, 4001, Australia, fax +61 7 3864 1170, basel_sultan@yahoo.com
s.kajewski@qut.edu.au

Abstract
The construction industry of Yemen is experiencing economic and technical problems, which permeate most aspects of the industry. In addition, construction procedures consume excessive capital, time and resources that have a direct flow-on effect for the national economy and the nation’s socio-economic development. Macroeconomic problems in unemployment, inflation and an inequitable balance-of-payments all add to the existing difficult economic situation in the construction industry. Further, the lack of appropriate infrastructure, weak and inefficient legal, administrative and financial institutions is also a major contributor.

The recent global shift to sustainable development requires that the construction industry in Yemen initiate important strategic developmental policies in order to meet future demand for economical and sustainable development.

Based on a previously conducted survey into the existing local development barriers and moreover on a census of experts opinions and discussions on a set of developmental policies and strategies, this paper establishes a comprehensive list of requirements and recommendations integrated with cultural aspects and hardships of Yemen to initiate the process to economic sustainability.

Keywords
Yemen, construction industry, policies, economic sustainability, process requirements.

INTRODUCTION
The construction industry as it plays an important role in the economy, and the activities of the construction industry are also vital to the achievement of the national socio-economic development goals of providing shelter, infrastructure and employment. However a report by the UNIDO (1993) has shown that little consideration is given to the construction industry by development planners and policy makers. There are problems and difficulties facing construction industries in developing countries, and the expected measures to manage them have been extensively investigated and many studies and recommendations have been made for action to address these difficulties [Turin (1973), UNCHS (1981), World Bank, (1984), UNCHS (1984), Wells, (1986), Ofori (1994) and Ofori (2001)]. The governments of some developing countries have implemented some of these
recommendations, however, results have been disappointing and the problems continue [(Ofori (1993) & Kirmani (1988)]]. It was suggested that the possible reason for the lack of progress was the absence of measurable targets in construction industry development programmes to guide and assess, at intervals, the success of their implementation [Ofori, 2001]. Ofori (1994) also commented on the reasons for this lack of progress in implementing these recommendations, claiming that it is due to the inappropriateness of some of the recommendations and the initiatives adopted.

Although, economic gain has been the driver for much of the unsustainable development that has occurred in the past, and the use of labour and raw materials was considered endless, nevertheless at the present these has to be sustained and the whole construction industry must move towards sustainability. Although Economics is known as the study of allocation of resources with competing and challenging uses; economics, to be relevant and applicable to sustainability, should not simply refer to Gross National Product, exchange rates, inflation, profit, etc. Economics is important to sustainability because of its broader meaning as a social science that explains the production, distribution, and consumption of goods and services. Thus sustainable economy consists of sub-themes, such as [Khalfan, 2000]:

- Investment in people and equipment for a competitive economy,
- Job opportunities,
- Vibrant local economy,
- Services are accessible which reduces use of transportation,
- Creation of new markets and opportunities for sales growth,
- Cost reduction through efficiency improvements,
- Reduced energy and raw material inputs, and
- Creation of additional added value, etc.

What’s more the key contribution of the construction industry to economic sustainability should be manifested through:

- sustained and efficient use of resources and materials;
- sustained employment opportunities in all construction phases and
- sustained investment and capital formation opportunities for the economy.

While it is agreed that we share a common goal for achieving a state of sustainability, the developing world, with its great diversity of cultures, realises there are different ways of defining and meeting this goal and be best determined at a local level. A shift to sustainability will not be motivating if it is to be costly, problematic and is not within the local capabilities and facilities. Similarly, the suggested actions have to grow from local initiatives, making use of local strengths and addressing local barriers. Chapter 28 of Agenda 21 specifically addresses the way in which local authorities will implement this plan of action. Ensuring implementation at the local level was deemed critical because ‘so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities’ [UNCHS, Habitat, 2000]. Chapter 28.1 called upon local authorities to work with their local communities to prepare Local Agenda 21 plans and local strategies for sustainability by the end of 1996. Because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulfilling its objectives, as local authorities construct, operate and maintain economic, social and environmental infrastructure; oversee planning processes; establish local environmental policies and regulations; and assist in
implementing national and sub-national environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilising and responding to the public to promote sustainable development. The International Council for Local Environmental Initiatives [ICLEI, 1997] defined Local Agenda 21 (LA21) as:

A participatory, multisectoral process to achieve the goals of Agenda 21 at the local level through the preparation and implementation of a long-term, strategic action plan that addresses priority local sustainable development concerns.

METHODOLOGY

In assessing the efficacy and value of the overall methodology employed in this investigation, it should first be emphasised that the objective was to shed light on the existing issues of the local construction sector in Yemen and then formulate the essential list of process requirements and recommendations for attaining economic sustainability development in the construction industry. The methodology used is based on the subsequent and previously conducted investigations:

- Data collection
- Survey on the local industry
- Policy selection and
- Delphi method for ranking and evaluating the policies

Data Collection

Literature and data collection was performed to build the necessary background on the country’s national economic and cultural situation. The broad data collected and reviewed has revealed that there are macroeconomic problems in unemployment, inflation and external debts. All associated with a shortage of information and a lack of infrastructure [Sultan & Kajewski, 2003a&b].

Key statistics on Yemen and its construction industry show that value added in construction decreased from 8 in 1975 to 3.4 % in 2003, and it employs 6.6% of the total working manpower. The Second Five Year Plan (SFYP) as proposed by the World Bank (2002) envisages an average annual increase in construction activities of 11% and as a result the sector’s share in GDP is planned to increase from 4.2% in 2000 to 5.5% in 2005. The construction sector is ranked 8th in its average relative contribution to GDP during the period 1990 to 2001. The average contribution to the GDP was 4.1%, compared with 29.5% for mining and quarrying, 15.1% for agriculture and fishing, manufacturing 11% and transportation 7.1%. Even before oil dependence, the construction industry made a moderately low contribution according to the Central Bank Annual Report (2002) with a negative balance of payment of over US$ 29.9 million.

Based on this relatively weak economic contribution by the construction industry and other issues are all an indication that the construction industry of Yemen is experiencing economic and technical problems. On top of that, the construction procedures also waste or rather consume excessive capital, time and resources that have a direct flow-on effect for the national economy and the nation’s socio-economic development. All has raised the concern that the construction industry in Yemen is obliged to change its approach in order to meet future demands for any sustainable and economical development, moreover necessitate the appropriate selection and implementation of
policies/strategies to guide this development [Sultan & Kajewski, 2004 & 2005]. Stretching out this paper put a set of necessary process requirements to facilitate successful implementation of these development policies. It is considered that without including these requirements and recommendations it would be difficult to implement sustainable development in Yemen.

**Survey on the Local Industry**

The survey on the local industry was performed and has recognized the technical barriers and economic bottlenecks facing the local industry development. The general conclusion on the barriers of development came as institutional and administrative weakness, in all forms of bureaucracy and corruption, followed by the lack of infrastructure required for economic activities and human settlements integration and well being, third was law and legal matters followed by financial and funding issues [Sultan & Kajewski, 2004]. The most important factors causing high construction costs were identified as imported materials, inflation and unstable economy and construction waste.

The survey concluded that there is an urge for institutional and administrative and human development to facilitate and monitor any required development. Construction regulations and laws can affect the choice and quality of the materials and will enable the designers to have more confidence in executing optimum designs. Monetary and fiscal policies should be designed to facilitate economic activities, control market prices, inflation. Moreover, the local development of the construction material industries should be adjusted and controlled by new and adequate choice and implementation of policies and strategies that provide development to local material industry and reduce consumption of foreign exchange. The adoption of explicit strategies and policies to reduce the impact of unemployment should be implemented through appropriate and more thoughtful labour employment. Yemen should seek to improve on the labour input in construction and only adopt those technologies that are relevant. The development of the construction sectors in Yemen should be aiming on optimising the utilisation of indigenous construction related resources and materials in their efforts to improve optimise their utility, uses and minimize or control importation [Sultan & Kajewski, 2004].

**Policy Selection**

The previous sections outlined the current situation on local requirements and constraints of the construction industry in Yemen and the need for appropriate institutional and legal reforms, economical solutions, effective technologies, appropriate type of construction systems, designs and construction materials or changed practices. Furthermore has pointed out that appropriate policies are required to stimulate and sustain economic development of the construction of Yemen.

Initially a range number of policies were selected; the author’s observations and knowledge on the local industry, and discussions with some professionals, the number of policies were rationalized to eight most appropriate and needed policies. The objective behind these policies is to attain progress aligned with sustainable development approach and to consider what is available. Some of other policies that were found less important and/or found beyond the research’s’ capacity, such as urbanisation and private sector intervention policies were put for further investigation and can be

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1 The list of policies and strategies were principally derived from literature and international agenda such as Agenda 21 for Sustainable Development; and also extracted from international organizations reports such as the UNCHS, UNDP, UNIDP and the World Bank.
found in later sections of this paper. Policies aimed at attracting foreign investment and policies
aimed at using of joint venture arrangements in construction, were eliminated and found impractical
and unsuitable within the short term implementations. The nature of the selected policies, a
description of the benefits derived from implementation of these policies and a discussion of their
limitations and suitability for developing countries in general and Yemen in particular are outlined
in [Sultan & Kajewski, 2005].

It has been realized that there is a need to initiate the role of government control over sustainable
economic activities through the use of efficient and suitable administrative, legal and economic
measures. Fiscal policies appeared to be prominent and were used extensively to encourage good
sustainable practice in the construction process. The construction industry in Yemen is also very
dependent on the importation of construction components and materials, thus necessitating the
search for policy and strategy alternatives to consider what is available, and what can be developed,
given adequate funding and resources. It is seems necessary to combine the use of administrative
measures with appropriate economic and legal means for enhancing Yemen’s overall capacity to
deal with issues concerning economic and technical developments to move towards sustainable
development.

The eight policies and strategies selected are listed as follows:

- Labour-intensive construction policies.
- Energy-efficient policies in design and construction.
- Credit and funding policies on selected projects.
- Local materials protection policy.
- Strategies for sustaining affordable infrastructure projects.
- Strengthening the law and regulations in construction and land affairs.
- Pricing policies and market control.
- Improve administration and institutional effectiveness and reduce all forms of
  bureaucratic procedure.

Up to this point the methodology have confirmed the selection of the most required policies and
strategies, and were subjected to a ranking process to establish a consensus amongst a panel of
Yemeni experts on the importance and possible implementation of each policy.

Delphi

An iterative group consensus Delphi method was used [Sultan & Kajewski, 2005] to establish the
priorities of the previously selected polices according to the experts’ opinions. The Delphi method
was used as a popular qualitative forecasting approach to obtain the consensus of opinion among a
group of Yemeni experts to rank these policies in terms of their priorities required in the
development process towards economic sustainability in the construction industry. Also each
specific policy is discussed, in terms of its possible implementation in Yemen, and the rationale for
some of the preferences made by the experts in their rankings. Discussion with experts has also
indicated that some policies are not applicable or difficult to implement at present. Although the
sustainable development agenda is a long-term strategy, the method narrowed to the short and
medium development forecast required in the transformation process.
The Delphi method investigation has concluded that the attainment of economic sustainability in the construction industry in Yemen is fixed to [Sultan & Kajewski, 2005]:

- fragile and corrupted institutional and administrative constraints,
- legal and regulatory practice weaknesses; followed by
- socio-economic barriers in the form of infrastructure shortages.

Despite the low ranking the design policy has gained, some experts indicated that the policy should be encouraged for the reason that, this policy implementation is approachable and manageable, especially when adapting traditional methods or materials. The policy of local materials protection was not strongly supported in view of the fact that the construction industry in Yemen is very dependent on the imports of construction materials the material industry is not ready to for an immediate takeover to fulfil the market demands. As well, the experts did not vigorously pursue the labour-intensive policy, to promote some local economic sustainable employment. This are due to productivity, cost and management problems associated with labour-intensive policy programmes. The fiscal, monetary and pricing policies to control unsustainable activities or products have not gained the support of the experts. Finally, despite the need for a financing system to facilitate credit, experts felt that funding through easy monetary and credit policies are not appropriate approach because of the existing lack of laws, regulations and the existence of corruption.

**PROCESS REQUIREMENTS AND RECOMMENDATIONS**

Based on the previous inclusive investigations and findings on existing development barriers in the Yemen case, the discussions and analysis of the experts’ opinions on policies, subsequent development process requirements and recommendations are formulated for construction industry in Yemen:

- The obvious need for institutional and administrative development and human quality obligations within a reformed legal environment is an appropriate starting approach for Yemen. Institution building and creating the appropriate level of control over corruption via good legalisation seems essential to any intended development. The availability of appropriate and efficient administrative procedures and a reduction in bureaucracy will facilitate economic activities and development process. Institutional development should eliminate current local constraint by facilitating appropriate sustainable practices and raise investors and participants’ confidence.

- The enforcement of laws and regulations are an essential factor in controlling the development process of the construction industry and associated industries. This is also needed to control illegal and unsustainable construction and economic activities and provide functional requirements for sustainable building designs and construction, stability and risk minimisation in the construction business.

- Sustaining an adequate supply of affordable infrastructure is considered necessary in the process for achieving efficient and economically sustainable construction development. The construction industry could reduce some socio-economic problems through sustainable industrial strategies such as cheap but effective locally based methods of providing infrastructure and affordable human settlements. Integrated planning is also essential to increase the distribution of affordable projects and minimize economical and environmental
disasters associated with major projects as is always experienced in Yemen. Poor investment decisions with respect to the choice of infrastructure projects always have devastating effect on the economy. Hence, comprehensive and detailed investigations for future projects and their impact on the economy and environment are needed.

- Reducing costs and energy consumption via sustainable designs and construction will necessitate the community acceptance, changes in engineering attitude and the education syllabus. Standards and specification guidelines must be established. Moreover, setting and implementing construction models and demonstrating sustainable projects for any government-sponsored projects by international organisations can effectively give support in this direction.

- The materials industry has to develop a more liberal and fair open market; however, this should be with the state control over selective imported materials. Import controls and fiscal mechanisms of taxation should be implemented mainly on imported material that is in direct competition with the locally manufactured low energy materials.

- Using fiscal and pricing measures as incentives towards sustainable construction will be inadequate in the short to medium-terms, especially where construction firms are unregistered and operate largely within the informal and unregulated sector of the economy. The market also lacks the information or market control to enforce the implementation of any pricing policies or market-oriented policies which influence the costs of particular forms of construction are of less significant influence.

ADDITIONAL REQUIREMENTS

Additionally to facilitate an economically sustainable construction industry in Yemen the following short to medium-term requirements are proposed by the author:

- It is necessary to improve the competence and ability of government human resources at all levels to play an active role in the sustainable development.

- Construction and economic activity manuals and guidelines should be established to streamline bureaucratic procedures.

- In the context of the decision-making process, the establishment of adequate and appropriate information and statistics is considered to be the basis for sustainable success and development.

- The Yemen construction industry should put more effort into minimizing resource wastage occurring within the execution of construction projects, decisions should be based upon competent and well-organized planning to prevent selection the low quality projects, and so minimize maintenance and life cycle costs with these associated projects.

- Efforts should be concentrated on the quality production and use of local low energy materials. The government and the private sector should study and initiate more research on the use of local materials and the recommended measures for their development. As the modern construction industry will be relying on imported materials for some considerable time to come, the local industry should best adopt practices that utilize renewable resources and materials with low embodied energy.

- Establishing a standardized market system in order to allow market mechanisms to play a fundamental role in resource allocation.

- Engineers must acquire the skills, knowledge, and information on sustainable development. The promotion of sustainable development demands that engineers cultivate an
understanding of the economical, social and environmental issues, risks and impacts on the community.

IMPLICATIONS FOR FURTHER RESEARCH

Discussions with experts have elicited a variety of views to further investigate the following policies and issues:

- Investigate the best process for the government to change institutional and legal systems to enhance sustainable development.
- Investigate whether the government should sustain and support small business enterprises and local firms for economic development or rather promote larger local firms.
- Will affordability be a major issue in sustainable economic activities?
- Investigate the effect of lean construction methodologies.
- Establishing methods to effect public perception towards sustainable development.
- Investigate policies aimed at the overall maximization of domestic employment to reduce poverty.
- Policies aimed at encouraging foreign and local investors intervention in infrastructure projects.
- Future policies and strategies on urbanisation.
- Policies aimed at integrating and improving the informal sector.

The fact is that Yemen will not be able to integrate the newer sustainable technologies into low-income communities for a long time. However, Yemen has a long tradition of construction that is more sustainable and better suited to local conditions than that introduced by imported technologies. Therefore, another key area for research is to identify these construction practices and materials and develop them further to provide an improved standard of living, while providing low-income communities with the opportunity to create livable and inhabitable settlements while sustaining their cultural heritage.

CONCLUSION

Investigation into the construction industry of Yemen has shown that the attainment of economic sustainability within the existing local institutional, technical and economical difficulties needed the establishment of integrated policies, at the same time, for the successful implementation of these policies; there are needs for interrelated requirements and recommendations within this development process. This paper has suggested these process requirements and actions based on the current local conditions and on the policy rankings and discussions with experts.

REFERENCES


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