

Priorities for Sustainable Construction Industry Development in Yemen

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Abstract:

Demand for sustainable and economic development necessitates the formulation of appropriate policies and strategies to facilitate the process of development. The construction industry in Yemen is facing difficult economic and technical problems, moreover, the political instability and the civil war have negative direct flow-on effect on the national economy and the nation's socio-economic development.

This paper presents a census of expert opinion, using a Delphi questionnaire methodology to rank a set of selected strategies and policies required to initiate the process for the sustainable development in the construction industry in Yemen. The proposed policies are derived from various international reports such as agenda 21 for Sustainable Development. It is found that the policies to improve National Security are the most important needed in recent times. The investigation concluded that the attainment of sustainability in the construction industry in Yemen is fixed to maintaining National Security, and fighting corrupted administrative institutions.

Keywords: Policy, Sustainable Development, Delphi, Yemen, National Security, Corruption,

INTRODUCTION

Yemen is one of the poorest regions of the world. The unstable status of Yemen raises atmosphere of frustrated expectations. The construction industry in Yemen is facing difficult economic and technical problems, moreover, the political instability and the civil war has negative direct flow-on effect on the national economy and the nation's socio-economic development.

According to Agenda 21 for sustainable construction in developing Countries [1] there is a sense of urgency about introducing sustainable construction development into the developing world as:

- *Firstly, the developing world is still under construction and every minute means the construction of buildings, roads, dams that will in all likelihood not support the principles of sustainable development*
- *Secondly, the pressures on resources in these countries mean that they cannot afford to make mistakes and have to make sure that what is being constructed now will be economically sustainable.*

It was reported by Sultan & Kajewski [2] that the main barriers of development in the construction industry in Yemen were institutional and administrative weakness and existence of all forms of red-tape and corruption followed by a lack of infrastructure required for economic activities and human settlements integration. Legal matters and financial issues also ranked highly. There are also macroeconomic problems in employment, inflation, and exchange rates.

Nine out of ten developing countries urgently need practical support to fight corruption, according to the new index. The World Bank [3] indicated that the main constraint in construction sector development is the law dealing with construction and land affairs. The absence of any existing regulations and legalisation should make things harder for all professions and stakeholders and land owners. The most important factors that caused high construction costs were identified as imported materials, inflation and unstable economy and construction wastes [2]. Factors that emerged clearly as less important are labour cost, local materials cost and availability of local materials, the technical problems are of lesser concern.

Recently, the national instability in Yemen is the main factor affecting all local investment and construction activities. According to Romm [4] there is no single universally accepted definition of national security. The concept still remains ambiguous, having originated from simpler definitions which initially emphasised the freedom from military threat and political coercion to later increase in sophistication and include other forms of non-military security as suited the circumstances of the time. Buzan [5] sees security as political, economic, social and environmental threats that affect the individual as well as the state at national and international levels. To other scholars, security is the absence of threat to acquire values or tendencies that would undermine national cohesion and peace as criteria for the determination of the meaning of security. Security is the condition or feeling of safety from harm or danger, the defence, protection and absence of threat to acquire values [6, 7]. Security is simply the existence of conditions within which individuals in a society can go about their normal daily activities without any form of threat to lives and property [8, 9].

Lacking of this constitutes considered a challenge to security. Omadjohwoefe [11] indicated that the Nigerian state should build strong viable institutions that can proactively respond to the challenges of security.

The chairman of Transparency International, Peter Eigen, at the launch of TI Corruption Perceptions Index [12] stated that "corruption in public projects is a daunting obstacle to sustainable development, and results in a major loss of public funds". Yemen scored 2.6¹ on the 2003 Corruption Perception Index and was ranked 88th from 133 countries, and in 2004 was ranked as 112th from 146 countries.

A marked distinction exists between developed countries and their developing counterparts in their ability to deal with environmental problems [13] and there is a huge gap between developed countries and developing countries with regards to technical, financial and institutional capacities, which are crucial to the successful rearrangement of economic and social relations as applied to production and consumption. The main difference is in institutional capacity, which underpins effective policy formulation and implementation.

There is a need for creating and enabling an economic environment through policy changes and more effective policy implementation. To realize this goal, there is a strong need for the public administration in developing countries to be efficient and cost-effective [14]. Unfortunately public administration in developing countries is, in general, highly bureaucratized and extremely centralized, based on an authoritarian legal. There is also an absence of effective

institutions to facilitate policies and support their implementation.

As recommended by Turin [15, 16] all inappropriate statutory regulations should be abandoned in developing countries. Agenda 21 (paragraph 2.37) also indicates that wherever appropriate, and taking into account national strategies and objectives, countries should remove the barriers to progress caused by bureaucratic inefficiencies, administrative strains, unnecessary controls and the neglect of market conditions. In addition Agenda 21 (chapter 8) highlights a variety of ways in which institutional frameworks can obstruct government decision-making for sustainable development. Institutional arrangements at all levels of government can create impediments to sustainable development policy-making, planning and management.

In many parts of the world, especially in non-OECD countries, red tape ranks very high as an obstacle to doing business, often being more important than financial [17, 18].

This paper disputes how the construction industry of the developing economy of Yemen can initiate the process towards sustainable construction industry development. This is achieved by proposing and ranking a set of selected policies and strategies that might be able to develop a suitable framework needed in the process for sustaining the construction economy. This set of policies and strategies have been compiled from international agendas (such as Agenda 21) and are selected to be inline with local conditions. Within the course of this investigation it was intended to raise awareness among professions and experts on sustainable development.

METHODOLOGY

This paper examines how the construction industry of the developing economy of Yemen can initiate sustainable development and economic sustainability in the construction industry. This is done, by proposing and ranking the most needed policies and strategies to develop a suitable framework able to sustain the construction economy in Yemen. In this paper an iterative group consensus Delphi method was developed to establish the priorities of these selected policies according to the experts' opinions.

Policy selection

The construction industry in Yemen will have to make fundamental changes for the purpose of improving the efficiency of the industry and to attain sustainable development and economic sustainability through appropriate implementation of policies. The selection of policies and

¹ (1 indicates total corruption, 10 indicates no corruption)

strategies is based on local conditions and the existing development barriers in the local industry.

The policies selected for ranking are:

- Labour-intensive methodologies
- Energy-efficient policies by implementing sustainable construction
- Fiscal policies on local protection and imports control
- Monetary credit policies
- Socio-economic development based on provision affordable infrastructure
- Enforcement and development of Law and regulation
- Price and market control
- Strategies for national Security
- Institutional and administration development

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.

Delphi

The Delphi method is used here as a popular qualitative forecasting approach to obtain the consensus of opinion among a group of Yemeni experts to rank the selected policies in terms of their priorities required in the development process towards sustainable development and economic sustainability in the construction industry.

The Delphi technique is regarded most appropriate, where the opinions of experts are needed as an input in policy arenas in which objective data is unavailable and subjective judgments play a significant role. Given that individual experts may hold widely varying opinions, it is logical to seek a consensus of opinions of a panel of experts. The value of consensus-forming techniques is based on the assumption that opinions of a group of experts will be more accurate than opinions of individual experts; correcting for individual bias and misinformation. The Delphi technique is a method for soliciting and collating group judgment on a particular topic through a set of carefully designed sequential questionnaires interspersed with summarized information and feedback of opinions derived from earlier responses [19]. Delphi is a qualitative technique that achieves group consensus while avoiding the hazards of face-to-face interactions, such as group conflict and individual dominance [19]. According to Alam [20] this is important because the expert panel will be composed mainly of experts and policy makers. In the governments of developing countries, there are inter-

ministerial, personal and departmental rivalries (e.g. central bank governor, finance minister, and planning agencies are often conflicting, rather cooperating forces). In the Delphi process, experts give their opinion without publicly admitting that they have done so, thus encouraging them to express a more personal viewpoint than a cautious institutional position [21]. It is estimated that 90% of the technological forecasts and studies in China are based on Delphi [22].

An expert group was formed to participate in this study. The questionnaire was responded to by experts from various sectors of the Yemeni government, private sector and academia. eleven experts were used as follows:

- Private Construction and contracting firms (A&B)
- Private Local consulting firm also representing the Ministry of Finance (C)
- The Ministry of Civil Work and Urban Development (D)
- Ministry of Planning and International Cooperation (E)
- Sana'a University, Faculty of Engineering (F,G,H)
- The University of Science and Technology (I)
- Sana'a University, Faculty of Commerce and Economics (J)
- Malaysian University In Sanaa (K)

The basic question posed to the panel was to review the nine policies listed previously. The questionnaire was delivered directly by email and indirectly via local representatives. During the initial round panel members were allowed to add any other suggestions or policies, which they believed would promote an efficient & economically sustainable industry. The panel members were allowed to ask any questions regarding any ambiguities of the rankings or policies and definitions.

The first round responses of the Delphi survey were tabulated and analysed using a distribution ranking table to annotate the average and median ranking and the order of importance of each policy. After the initial rankings were obtained, the rankings of all experts were tabulated and this information was returned directly to the panel members with the instructions to review the rankings of the entire panel and reconsider whether they would make any changes in their ranking accordingly. As the average and median ranking generally remained the same, it was decided that a two round Delphi process was satisfactory. The responses for the second round (Table 1) provides a summary of the policy rankings according to each of the panel members.

Table 1: Delphi Final Round

Policy	Rankings by experts											Average ranking	Median ranking	Ranking order
	Private sector			Government		Academics								
	A	B	C	D	E	F	G	H	I	J	K			
1. Labour-intensive policies.	2	2	9	6	9	7	9	7	8	6	5	6.4	7.0	7
2. Energy-efficient policies in construction.	6	6	7	2	5	3	7	9	6	5	8	5.8	6.0	6
3. Credit and funding policies	9	8	5	9	8	5	5	8	9	8	4	7.1	8.0	9
4. Local materials protection policy.	1	4	8	7	4	9	1	6	5	7	9	5.5	6.0	5
5. Strategies for sustaining affordable infrastructure projects.	5	7	3	5	6	8	8	4	3	4	6	5.4	5.0	4
6. Strengthening the law and regulations	3	5	2	4	3	6	2	3	2	3	3	3.3	3.0	3
7. Pricing policies	8	9	4	8	7	4	6	5	7	9	7	6.7	7.0	8
8. Strategies for national Security	4	1	6	1	2	2	3	2	1	2	1	2.3	2.0	1
9. Improve administrative and institutional effectiveness	7	3	1	3	1	1	4	1	4	1	2	2.5	2.0	2

Ranking: 1-2 high, 3-4 good, 5-6 is low and 7-9 is very low

DISCUSSION OF POLICIES RANKING

This section presents an evaluation of the ranked policies and a discussion of these policies in terms of their suitability to stimulate the indigenous construction industry, according to their ranking by the experts.

Labour-Intensive Construction Policies

This is a macroeconomic policy for the promotion of labour-intensive techniques, in part by mandating minimum crew size on construction projects. Such a policy could stimulate employment by increasing the labour content per project, reduce poverty and increase the competitiveness of indigenous firms against foreign firms by reducing the advantage of higher productivity by capital intensive foreign firms.

The ranking by the panel members on encouraging and promoting labour intensive policies in construction activities was ranked low. Another government member (E) indicated that this was always influenced by the procurement policies of the lending organisations.

Most members representing gave a low ranking for this policy. This was to be expected due to the concerns the private sector has on the issues of productivity in the project, and excessive costs and delays associated with this approach.

Above all, the major problem in increasing the number of labour-intensive projects is the high requirement for site management and the high administration costs of labour-intensive projects.

The negative aspects of a labour-intensive policy includes its Requiring higher labour content which act as a discouragement to local firms to invest in productivity-enhancing capital, which ultimately would allow it to compete with foreign firms. Also the high content of labour will require a high measure of management and supervision which is difficult due to a scarcity of skilled technicians, foremen and site engineers. In many developing countries, including Yemen, there is a shortage of managers and supervisors making it more attractive to use plant and equipment.

While Agenda 21 and the Poverty Reduction Strategy Paper (PRSP) support labour-intensive policy in terms of promoting employment and skills in the indigenous industry and decreasing poverty, there will always be a lack of interest in this policy from the private sector and international organizations such as the World Bank, due to problems of low productivity, management difficulties, delays and excessive costs associated with labour-intensive methods.

Energy-efficient Policies in Construction

This policy is based on paragraph 7.69.c of Agenda 21 [23] that is to adopt standards and regulatory measures which promote cost and energy-efficient designs, construction technologies and the sustainable utilization of natural resources. This can be achieved by mandating the reduction of life cycle cost and total energy used in the built environment, by utilisation of certain design and construction measures.

The ranking for this strategy was low, experts felt that the community will be unwilling yet to change in addition to the market is not ready to adopt new technologies. Furthermore, the construction sector is dominated by local companies, formal and informal contractors who are not interested and not comfortable to technology changes involving risks and extra costs, nor do they have the experience. The absence of research on best traditional design and construction models, and absence of guidelines on standard methods and materials is a major constraint.

Some experts such as the private local consultant and the expert representing the University of Science and Technology supported this policy and indicated that this policy must be implemented and encouraged for the reason that, the policy implementation is approachable, especially when adapting traditional methods or materials.

Credit and Funding Policies on Selected Projects

A policy of credit falls under the category of easing monetary policy and is used to stimulate economic activity by making credit available to business. Credit is an essential resource for construction enterprises. Some have identified poor access to funds and finance as the most serious problem facing contractors and stakeholders in developing countries. A decrease in money supply tends to reduce developers cash flows, thereby leading to a decline in construction activity [24]. The World Bank advises that a basic strategy for improvement of the construction industry of developing countries should include encouraging financial institutions to offer credit to contractors on reasonable terms. The effects of lower financing costs have been demonstrated through comparisons in some developing countries in which credit availability differed significantly.

A policy of credit easing was ranked down in both rounds by most members particularly those representing the private sector, the government members and one academic. The generally good ranking given by the local consultant was expected given the Central Bank's commitment to currency and investment stability.

Most of the member's opposition to credit easing is derived from the lack of trust in the existing weak law and banking institutions and the lack of financial management and honesty in using funds in an appropriate way or on inappropriate projects. Despite the need for a financing system to facilitate credit, experts felt that, with the existing lack of law and regulations and existence of corruption and bureaucracy, a high percentage of the funds will actually be wasted in all

phases of the project. Likewise, the current banking system suffers in regards to repayments of loans from the borrowers.

Yemen has little choice in adopting a different credit and funding policy given that international funding organisations are the main policy enforcers. Furthermore it must be noted that the policy of credit easing has some potential drawbacks:

- Easier credit can lead to construction overexpansion and instability.
- In the absence of law and the existence of corruption, funding will be misused

Local Materials Protection Policy

This policy has received low rankings from most members except there was an inclination to market and industry protection from the private construction-contracting firm and one expert member representing the Faculty of Engineering.

Most members feel that it will be too hard for the local industry in the short and medium term to make any shift from the current situation of overdependence on imports, there are also worries that the little investments and research in the building materials and material alternatives make it hard to initiate any change.

It seems that for the short and medium term the industry will remain over dependent on imports; the rationale here is consequently the control of imports and encouragement of efficient design and practice. Nonetheless, to implement such policies, stiff control over quality of materials and prices for substitute goods should be imposed to inspire public confidence. Protection and fiscal policies may also lead to an increase in smuggling of construction materials and black-market activities.

Strategies for Sustaining Affordable Infrastructure Projects

It was shown previously that the basic nature of infrastructure systems in Yemen has been a major factor hindering prospects for sustainable economic development.

The persistence of poor economic growth in the region over the last four decades has in turn limited the scope for affordable infrastructure development. The policy for the supply of affordable infrastructure was ranked relatively good by most participants; ranked 4th.

The financing of infrastructure investments in Yemen has almost invariably depended upon the provision of public funds and foreign aid. The government controls almost all the infrastructure work. The role of private finance, in general, and Foreign Direct Investment (FDI), in particular, has been negligible; and prospects for these to replace government funding and foreign aid as a strategy for financing infrastructure development do not appear to be promising as most private investors do not consider Yemen an attractive for investment, partly for reasons of political instability, and because of the region's low average income and the small size of markets for infrastructure services.

Poor investment and decisions with respect to the choice of infrastructure projects could have a devastating effect on the economy, environment and the society. Examples can be found in water projects in Yemen [25], others are in shattered road projects. A high cost strategy of growth would consequently be inappropriate to the social and economic circumstances of poor countries. There is good reason to believe that investments in pro-poor and affordable infrastructure projects are most likely to be growth promoting, while infrastructure projects with a high capital-output ratio are likely to be growth constraining. Also as stated by Ofori [26] and Ganesan [27] that projects should, for developing countries, be of simple technology, and make use of low levels of equipment and high levels of labour.

Strengthening the Law and Regulations in Construction

Most members of the panel gave a high ranking and supported policies for reinforcing the law and regulations, with the exception of the member representing a private contracting firm.

All experts felt that in order for the construction industry to change its technology, procedures or investment programmes to achieve increased sustainability, it will need some appropriate laws and regulations to control the process. Some pressure on the industry will result when the clients (government and international organizations) decide that they will require their designers to act in a more sustainable manner. At the same time designers and builders would like to have appropriate and enforced regulations to help them conduct their work in a sustainable manner.

The absence of any existing regulations and legalisation makes things harder for all professions and stakeholders and land owners, this will always lead to informal and unsustainable activities.

The existing multiplicity of agencies working to their own conditions of contract, and the differing languages in which contracts are written, only adds to the confusion. Ideas differ on major issues such as the validity of agreements, the obligations and liability of managements, the obligations and liabilities of two parties in a contract, the resolution of disputes, penalties and damages and the adequacies of compensation. Thus in order for the construction industry to change its technology, procedures or investment programmes to achieve increased sustainability it will need to formulate laws and regulations to control the process.

Likewise, there are legal concerns about contractors and suppliers using unsustainable standards, materials or activities; especially where sustainable activities are considered more expensive or less desirable.

Pricing Policies

A policy for pricing indigenous construction activities and materials was ranked very low. The experts representing the private construction and contracting firms were, however, in favour of this policy. To control price in the choice of

materials, construction technologies and designs, seems to have the support of the private sector but not the academic members. The local consultant also ranked the policy very low.

The academic members think that supporting such policies by subsidising the price of some items or activities within a weak economy is bound to fail. The government's role in controlling prices has become very limited, particularly since Yemen depends on imports in many sectors. The government will find it hard to control prices, which are determined according to different factors such as the exchange rate and international prices.

Prices can be used for monitoring and controlling any sustainable practices. However, a technically efficient production process, especially in a perfectly competitive market environment, should guarantee competitive prices that can be passed to consumers in the form of lower product prices. Subsidies to support any prices are also difficult in weak economies.

Strategies for National Security

Most experts sought that securing national stability by fighting terrorism sought to be the first priority for any intention towards sustainable development.

Administrative and Institutional Effectiveness

Policies aimed at reducing bureaucratic procedures and corruption are highly favoured by most members of the panel with the exception of the local consulting firm. While eliminating bureaucratic procedure seems hard with existing deficiencies in other sectors and institutions it is still thought to be one of the main issues from which to start reform. Institutional development is ranked as the initial most effective requirement for facilitating progress in the development process.

Certain activities such as reuse and recycling and should be given encouragement to investor users and clients. Bureaucracy will always be an obstacle in discouraging any intended development. Any difficulty in obtaining permission for recycled or reused materials will lead contractors to go the easy way of purchasing raw and newly produced materials even at a high cost.

Public administration is resistant to change, and is highly bureaucratic in terms of an over commitment to regulation and rules. Also public administration institutions are typically paid out of an allocated budget, which is not based on results and performance. Thus, there is apparently no pressure on them to perform better.

CONCLUSION AND RECOMMENDATIONS

The use of consensus-forming techniques allowed the merging of experts' opinions to rank the best approaches in the process to achieve sustainable development and economically

sustainable construction industry. Discussion with experts also indicated that some policies are not applicable or difficult to implement at present.

The investigation also concludes that the attainment of sustainable development and economic sustainability in the construction industry in Yemen is constrained by fragile national security and corrupted institutional and administrative procedures, also fixed to weaknesses in legal and regulatory practice followed by socio-economic barriers in the form of infrastructure shortages.

Despite the low ranking some experts indicated that the design policy should be encouraged for the reason that, the policy implementation is approachable and manageable, especially when adapting traditional methods or materials. 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. The experts did not vigorously pursue the labour-intensive policy, to promote some local economic sustainability in employment. This is due to productivity, cost and management problems associated with labour-intensive policy programmes.

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.

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