

ADAPTATION TO CLIMATE CHANGE BY REAL-ESTATE SECTOR: A CASE STUDY IN DEVELOPING COUNTRY

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ABSTRACT

Adaptation to climate change to minimize negative impacts on vulnerable community is a serious concern for developing countries. Though limited resources and capacity of those governments urgently requires engagement of private sector in adaptation, the responses from private sector or businesses are less visible. The objective of the case study is to explore how a real-estate business in developing country is engaging itself in adaptation to climate change and what are the main drivers and barriers in the adaptation process. The case study reveals that though organization might recognize climatic stimuli to affect business performance, adaptation responses depend on a number of external and internal non climatic drivers or barriers like market force, regulation, technology, awareness, resources, capacity, leadership etc. In Bangladesh low awareness, high price of adaptation technology, lack of information and adaptation finance, corruption, political unrest and unfriendly regulatory environment are the main barriers to adaptation. Government must incentivize the real-estate sector by changing urban planning, building code, taxation etc., and by patronizing research, integrating other regulations that directly or indirectly can help the real-estate business to be engaged in adaptation to climate change successfully.

KEYWORDS: Real-Estate, Adaptation, Climate Change, Developing Country.

The new paradigm of ‘engaging private sector in adaptation to climate change’ is gaining worldwide attention and is based on two major assumptions. First, governments of vulnerable developing countries lack required resources and capacities to cope with current climate change impacts, and adaptation finance received from international donors will also be insufficient to meet the future adaptation cost [1][2]. So, participation of private sector or businesses in adaptation activities with government/NGOs is highly desired as social responsibility of business. Second, climate change will pose significant business risks (extreme weathers, raw material shortage, tougher regulation etc.) as well as opportunities of investments for new climate proofing products or infrastructures, and businesses will automatically adapt to protect their operations and exploit beneficial opportunities. Though PSI (Private Sector Initiatives) database [3] and some literatures based on private sector in developed countries (like [4],[5]) give some idea about business engagement in adaptation to climate change, we have very limited knowledge about the issue [6]. Due to scarce literature in this field, we know very little about business activities in developing countries to tackle climate change as well as impacts of those activities to build the resilience of the vulnerable community [7]. Bangladesh, as a highly climate vulnerable developing country in south Asia, most often suffers from different climate hazards like cyclone, flood, salinity, draught, heat-stress, diseases etc. [8][9]. But, there is lack of empirical evidences on business engagement in adaptation to climate change [10][11]. With a view to understand the present state of business engagement and to identify the key barriers and

enablers in adaptation to climate change, the authors selected a real-estate company in Bangladesh for case study.

THEORETICAL PERSPECTIVE AND METHOD

Till to date the literature on business engagement in adaptation to climate change is developing and we can grouped them into three theoretical approaches: risk management perspective, behavioral perspective and institutional perspective. All the three perspectives have same common objectives but differ slightly from each other based on primary assumption. Literatures on risk management perspective (like [4],[12],[13]) assume that climate change brings different risks and opportunities for business, and cost of taking proactive adaptation measures to minimize those predicted risks or to take benefits of presumed opportunities must be lower than expected gain of the organization. Behavioral perspective refers to the reactive self-directed actions of businesses to adjust with perceived changes in external environment. Literatures (like [14],[15]) on behavioral perspective argue that adaptation responses depend on past experience, perceived threats or opportunities on performance and adaptive capacity and institutional context of the organization. Institutional perspective assumes that business engagement in adaptation can be accelerated by the institutional intervention. Literatures (like [16],[17]) advocates on government’s role for creating enabling environment by conducive policy, incentives and supporting infrastructures to engage private sector in adaptation to climate change in developing countries.

Following behavioral perspective based on Berkhout[18], the authors assumed that organizational adaptation process to climate change divided into three different phases: perception, evaluation and enactment. By the influence of a number of direct or indirect external factors (like floods, cyclones) or actions of stakeholder (like government regulation) organization perceive of (strongly believe in) different potential threats and opportunities on its performance. Then evaluate the possible solutions or course of actions (strategies) to deal with those identified adaptation issues based on different internal factors like resources, capacity etc. Finally, organization enacts the strategies or actions as adaptation practices. Feedback from external environment continuously helps organization to improve adaptation strategies. As suggested by Yin [19], qualitative data have been collected from semi-structured interviews (with top-manager, mid-manager and stakeholders), non-participant observation (site visit, observing operation, public relation and external engagement) and company documents (like internal memo, website, advertisement etc.). Then data have been analyzed, validated and grouped to write case report.

CASE STUDY AND CONTEXT

Increasing population and high rate of rural-urban migration have created a significant demand for urban housing in the major cities in Bangladesh mainly in Dhaka and its adjacent neighborhoods over the last few decades. According to an estimate of REHAB (Real Estate and Housing Association of Bangladesh), there are more than 1500 registered and unregistered private developers offering apartments of different sizes. Though overall contribution (7.2% of total GDP in 2009-2010) to national GDP is not big enough, real-estate sector facilitated a significant growth in related industries like cement, brick, iron, ceramic, glass, paint etc. and employs a large portion of population of the country. Building For Future Ltd. (BFL) is one of the reputed real estate companies in Bangladesh and provides housing for middle-income population. Since inception in 1994 the company is continuously growing and has converted in to a business group consisting of six separate organizations in building technology field. As buildings are responsible for one third greenhouse gas emission and consume about 40% of global resources [20], adaptation to climate change by real-estate sector is very important for a climate affected Bangladesh.

FINDINGS AND DISCUSSION

Perception

Top managers of the BFL believe in climate change impacts but they do not want to address it as priority issue right now. With the emergence of green movement or sustainability issue in the field of architecture and urban planning, real-estate business always tries to incorporate climate change mitigation and adaptation in their core business functions. But, due to uncertainty of climate variability and low probability of getting immediate return from long term investment, BFL is still waiting for the market force and other external stimuli to be fully engaged in adaptation. However, from the interviews a number of external influencing factors have been identified for which they are taking or plan to take adaptation measures.

External Drivers: Business Risks and Opportunities Due to Climate Change

“Building industry will face physical, financial and regulatory risks of climate change. We are still fighting with energy crisis and bureaucracy of government agencies to getting building permit and utility connection on right time. Though we might get new opportunities to build energy efficient building and low-cost housing, yet we did not get any response from our customers and government.”

Due to huge concentration of population and high land price, now-a-days, suitable lands are unavailable inside the city centers. So, real-estate companies must move to outskirts neighborhoods where getting flood free land, supportive infrastructures and utility connections are very difficult due to poor urban planning policy. Government already stopped any new gas connection for residential and industrial use. Moreover, due to environmental regulation, traditional fossil fuel based brick-kilns have been decreasing and moving away from adjacent urban areas. So, high transportation cost to bring them from distant area is adding extra cost in construction. Increased temperature in urban area is requiring increased air conditioning load, but shortage of electricity supply making it difficult for real-estate companies to satisfy their customers. Besides, frequent load-shading (shortage of electricity supply) obliged the apartment owners to buy diesel (fossil fuel) to run generator for long time. Due to river salinity, sands used in concrete mixture and brick-laying are found to be mixed with more salts while collecting from river bed. So, it requires several times washing by fresh water to take away the salt particles from sand to avoid construction faults. As

Bangladesh is a developing country, most building materials are imported from foreign countries. But, high tax and increased prices of those materials in international market is causing the developer companies spending more money day by day. Growing public awareness for climate change is increasing the demand for energy efficient or green building. But, delayed certification process, costly materials and unavailable technology are the main obstacles in bulk production of green buildings in real-estate sectors. Still, the existing customers cannot afford the cost of traditional buildings. So, low cost housing for urban poor or climate migrants is a dream in reality.

“We sit with government agency several times to give us land and subsidies so that we can produce low cost housing for vulnerable population both in rural areas. But, no negotiation was successful.”

In Table 1 a number of direct and indirect impacts of climate change on different business processes of real-estate Company have been analyzed base on Hertin and his colleagues [21].

Corruption and Bureaucracy

It is evident from the case study that in Bangladesh real-estate sector is suffering from high level of corruption and bureaucracy in different government agencies. Unexpected bribes and long time for getting building permit, approval of public utility connections, property registration etc. are already increasing construction cost and project duration. So, investing extra money for environmental concern and community welfare is quite difficult for BFL.

Political un-rest

Political environment in Bangladesh is not stable over the last 10 years. Social unrest and abruptly changing economic & regulatory environment are hampering normal day to day business. Declining revenue during the last few years make real-estate managers afraid of doing further investment like adaptation to climate change.

Technology

Though globally building industry is now using advanced design techniques (like Building Information Modeling), construction process, materials and technology, Bangladesh still using traditional construction process. Most advanced or efficient building materials are still imported as local industries are still growing. So, government tax, carrying cost and time associated with importing those building materials

and equipment are the major barriers for real-estate sector for engaging in adaptation to climate change.

Stakeholder's Actions

Government

“Government policy is the only barriers to flourish the real-estate business in Bangladesh.”

Till now there is no evidence of government effort to engage real-estate sector in adaptation to climate change. Like many other countries there is no National Green Building Council or Certifying Agency and government incentives to build green or climate friendly building. Existing urban planning policy and building code can only ensure the basic human need, and in some extends they are criticized for failing to provide healthy environment for existing urban population.

Customer/Business Partner/Media/Social Activists

“There is strong competition among real-estate companies to retain market share. We are always in pressure to minimize production cost. But, making green building always adds extra cost.”

Demand for costly green building is not yet prominent, as the customers cannot afford the cost of existing high price for traditional building. All the real-estate businesses are owned locally and they have very little opportunity to learn from advanced multinational organizations through technological collaboration or knowledge sharing. Media or social and environmental activists are very weak in Bangladesh to oblige government to enforce any new laws protecting environment or accelerating mitigation and adaptation process.

Evaluation

Though there is no separate unit or dedicated person to assess climate risks and opportunities for taking appropriate adaptation decision, Chairman and Managing Director of the company instruct General Manager (construction) to evaluate possible adaptation measures according to the resource and capacity of the organization. While deciding on adaptation actions, priority is given to problems that required immediate solution or company already experienced.

Internal Drivers

Awareness

Though top managers BFL declared that they are fully aware of climate risks and opportunities, general employees are not very much conscious of relating climate change impacts on future business.

Awareness of top manager of BFL is limited to the direct risks or opportunities of climate, but they have very little knowledge about getting indirect benefit of engaging in community adaptation needs.

Adaptive Capacity

“We are fully capable organization but money is the only fact. Even we do not know whether climate fund will be available for real-estate sector in future or not.”

BFL identifies itself as a fully capable organization in respect of knowledge and human resources to adapt to climate change. The interviewees mentioned that the only barriers to adaptation are appropriate finance and friendly government policy to accelerate the process.

Leadership

The dynamic leadership of BFL’s Chairman are helping the company to innovate many custom made building materials and construction techniques. To reduce dependency on vendors and suppliers, the organization already has started own subsidiaries by related diversification. But, due to resource constraint and lack of friendly regulatory or business environment, the top managers cannot set many visionary goals and objectives including adaptation to climate change.

Enactment Climate Proofing Own Business

“Though our company is currently not involved in construction of 100% green building, the management follows appropriate processes to reduce energy consumption throughout the whole life-cycle of every building construction project.”

From land selection to handover of finished building in every phase like design, material procurement, construction execution, maintenance etc. resource efficiency and climate proofing are taken as serious considerations in BFL. The organization mentions both long-term and short-term strategies to adapt to climate change:

Long-Term Strategies

(a) Flood and cyclone proof buildings. (b) Resource Efficiency

Short-Term Strategies

(a) Tackle power or energy crisis. (b) Change building design & construction methods.

Green Building

Though BFL does not build 100% green building, its design team always tries to ensure adequate daylight and natural ventilation in their buildings to reduce lighting and cooling load. Roof gardening is another strategy to reduce urban heat-island effect. The company built their own corporate office and ensured the resource efficiency in same ways as mentioned above.

“As adaptation strategies we are adopting new construction techniques. We also stopped using many traditional building materials and tried newer building materials to minimize construction cost and to gain sustainability.”

Over the last few years, use of tiles, long span glasses, different prefabricated partition materials have increased significantly in BFL as well as in whole building industry. Traditional cast-in situ mosaic flooring has been replaced by floor tiles. Brick partition walls are avoided when necessary. Melamine board, wooden particle board, plastic board etc. are using to divide and decorate interior spaces to reduce live load and time.

Water Management

Water management is not a serious concern for BFL management. Though level of ground water in greater Dhaka city is going downwards day by day, they still depend on WASA (local water utility company). However, according to current regulation the company sets up own on site deep-tube well for building with certain number of occupants. Installing rain water harvesting system and waste water recycling plant is not widely popular among real-estate owners, as the initial investment is much higher than total cost for paying regular water supply bill annually.

Recycling and Waste Management

BFL currently does not have any standard recycling system. They sold out wastage materials to outside vendors directly.

Emission Reduction

The Company also does not have any emission reduction target.

“We are still growing. We are not interested to invest money to mitigate greenhouse gas. Using natural resources to run building or minimize energy is enough.”

Renewable Energy

As per government regulation, on the roof top of every building BFL installed solar panel that supplies a negligible amount of electricity for emergency use. If any opportunity comes to produce renewable electricity commercially then BFL will rethink it.

Green Supply Chain

Most of the BFL's cars and vehicles have been converted in to CNG (Converted Natural Gas) based engines. So, they are saving petroleum cost and less responsible for air pollution. But, a major portion of energy consumed by building is embedded energy in construction materials (energy used for manufacturing of those products). As there is no strict government regulation and guideline to produce and procure green building materials, BFL is unable to ensure the energy efficiency issue in procurement or supply chain of building materials.

Training

The Company provides occasional training to its managers, engineers, construction workers, contractors and suppliers about resource efficiency or environmental hazards. But, customized or specially designed training about climate change mitigation and adaptation has been not planned yet.

Providing Climate Proofing Products

“Still now our social activists and customers are not strong enough. When our people will be conscious about environment and their right, demand for green buildings will be created automatically.”

BFL currently does not build green building or any low cost housing, but they will provide in future when market demand will be created. At present existing customers cannot afford the cost of traditional buildings and expensive green building is a mere dream for them. Initiative of low-cost housing is never seem to be feasible. High land price, delayed building permit and construction cost make it impossible to build perfect low-cost housing that can be afforded by poor or climate victims.

Engaging With External Bodies

BFL is actively participating in adaptation project financed by two foreign organizations: FaelKhair and US Army-Alaska District. Till today the company finished construction of 22 cyclone shelters in coastal climate affected districts in Bangladesh. In future the organization expects to participate in construction of other climate proofing infrastructure in partnership with

NGOs or local government. In addition to regularly donate money for the development of art and architecture, BFL published a magazine called ‘Sthapatya o Nirman’ annually to raise awareness among general people and building practitioners about environmental problems, building technology, urban planning, photography, art and culture.

Feedback

Some Feedback of adaptation actions are immediate like the financial benefits of climate proofing of operation, but some feedback are still to come in near future. Table 2 lists a number of climatic and non-climatic drivers/enablers of engagement in adaptation to climate change by real-estate sector in Bangladesh.

CONCLUSION

To conclude we can say that engagement of real-estate sector in adaptation to climate change in Bangladesh is still evolving. Though organization takes only reactive adaptation measures to some of the external forces having direct impact on business profitability, it fails to recognize future business opportunities associated with adaptation needs of vulnerable community. The organization also showed weakness to address its social and environmental responsibly for having no effective CSR and environmental reporting. In spite of having shortage of energy (gas and electricity) and safe water, the case company yet did not take any self-initiatives for waste/water recycling and harnessing renewable energy. The important ant findings of the study is that real-estate sector in Bangladesh is more responsive to non-climatic drivers than to climatic drivers of adaptation. So, weak non climatic drivers of adaptation like government regulation, social awareness, actions of other stakeholders (customers, media, activists) needs to be made stronger, and different barriers like corruption, high cost of adaptation technology, lack of information and adaptation finance etc. to be removed. Government must revise the existing faulty urban planning principle, building code, energy policy, and elaborate the Bangladesh Climate Change Strategy and Action Plan, 2008. CSR activities aligned with the required themes to improve the community resilience for climate change has to be made mandatory. To incentivize the investment of real-estate sector in renewable energy and climate proofing infrastructures, more opportunities need to be created through public-private partnership projects. Companies must also increase their awareness and develop climate leadership by proper training to employees, suppliers or business partners, and maintain

business ethics.

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Table 1: Direct and indirect impacts of climate change in real-estate sector in Bangladesh (following the framework of Hartin et al. 2003)

Impacts of Climate Change							
	Direct impacts		Indirect impacts				
Business process	Extreme events (cyclones, floods, rainfall)	Gradual change (increasing temp. Down water level)	Through Regulation	Through Techno-logy	Through Supply-chain	Through customers	Through market force/social change
Procuring Land	Lands are avoided in climate affected areas.		Restriction on building permits in flood & cyclone prone areas.			Customers are not interested to buy flats in flood & cyclone prone areas.	High price of land in flood and cyclone free areas.
Designing & building permit	Both design cost & time have been increased as more environment related design parameters are being considered.		Land use policy & building code are becoming harder day by day.			Customer's preference has increased for environment friendly building	
Selling and marketing plan	Reduced price of property in floods and cyclone prone areas.		-Longer time necessary to get building permit & utility connection -Imported green materials are costly for high tax.			Customer's preference has increased for environment friendly buildings.	Media hampers reputation for development adjacent to environment sensitive location.
Construction Execution	Extreme weather events hamper construction works and increase project cost and time.			Adaptation technology like water/waste recycling & renewable energy technology are costly.	-Difficulty in delivering building materials to const. site. -Salinity is decreasing the quality of sand & bricks		
Maintenance	Gradual damage of building causes high maintenance cost.	-More Cooling load in summer -Water scarcity				Customer's dissatisfaction for long use of generator due to energy crisis	Pressures on public utilities for climate migrants in urban area.

Table 2: Shows a number of drivers/enabler and barriers for adaptation to climate change by real-estate sector in Bangladesh.

		Drivers/Enablers	Barriers	
Climatic	Extreme weather	Occasional floods, excessive rainfall and heat stress in city center are major drivers		
	Uncertainty		Due to uncertainty of extreme weather and climate variables organization's perception is not clear for adaptation measures.	
Non Climatic	External Factors	Regulation	Friendly regulation and policy can accelerate real-estate engagement in adaptation.	Faulty building code, urban planning, financial regulation, utility & energy policy are hampering adaptation process in real-estate sector
		Market force	Demand for green building & low-cost housing are potential drivers for adaptation.	High land value in flood and cyclone free areas.
		Technology	Green materials, machineries and construction techniques ensure cost savings and resource efficiency.	Higher initial cost of adaptation technology and skill manpower to operate them is a barrier to adaptation.
		Information	Proper information from government, media, and academia help business to formulate adaptation strategies.	Due to lack of information organization fails to relate climate impacts on organization's performance and hinder adaptation.
		Corruption		Corruption in government agencies for getting services (like building permit and utility connections) discourage business to engage with govt. in adaptation activities.
		Political un-rest	Lack of Political stability make managers is afraid of further investment in adaptation.	
	Internal Factors	Awareness		Low awareness about climate change impacts among employees and customers hinders company engagement in adaptation.
		Capacity		Lack of expertise in climate risk assessment and skill labor force to handle climate friendly construction.
		Resource		Lack of easy access to adaptation finance by govt. or private bank.
		Leadership		Lack of visionary leadership to consider climate agenda in business model.
		CSR	Existing CSR activities to improve community	

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