

SUSTAINABLE CONSTRUCTION: DRIVERS, BARRIERS & DESIGN PRACTICES OF RESIDENTIAL BUILDING PROJECTS IN KABUL AFGHANISTAN.

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Abstract: The terms Sustainable development most thoroughly addresses the natural, social, and monetary parts of structures with regards to its locale. While supportable development is the perfect phrasing that expounds on the utilization of economic improvement. Even though in foundation the commonality on these areas is continually developing wherever on the globe; in the Afghanistan, bearable arrangement practices didn't at present all around down to business in development building even though in structure designing precisely. The term maintainability on the development industry spoke to water utilization, indoor natural quality, site area, material use, natural effect, and commitment to environmental framework wellbeing. 55 pragmatic answers were prevailing after 65 organizers working. Along these lines, this reality procured were explored in working various arithmetical methodologies, similar to that; realistic arithmetical, inferential measurement test, factor investigation, Paired example Wilcoxon Test, Pilot test on the poll. This Research oversees six tough development practices that designing which these activities that the specialists accomplish such a great deal energetic and execute on their Residential structures Projects at Kabul Afghanistan. In like manner, three activities were explained which these are now and again worked in private structure Projects at Afghanistan; 1: centrality including power 2: valuable strategy, 3: consultant commonality necessities. At last, this examination distinguished 5 highlights (obstacles) that keep away from these activities of strong development practices at private structures projects in Afghanistan. And finely the main Drivers and Barriers are designed with main factors and their usage on residential structure projects in Kabul Afghanistan.

Key-words: Sustainable development, sustainable construction (Exercises), construction engineering, residential structure designs, promoters (Drivers), preventers (Barriers).

1: Introduction:

Sustainable construction has developed to be perhaps the most smoking theme the world over from the most recent couple of decades. It was the 1960's the point at which general society in the grew piece of the world indicated their anxiety about nature; A couple of years after the fact in 1972 the issue (in regards to the ecological concern) was expedited to the table in the United Nations Conferences on Human Environment, held in Stockholm. Redcliff (2006) states that "the term 'Manageable Development' came in to utilize approach hovers" in 1987 after the production of World Commission on Environment and Development (WCED) under this heading of customary up and coming additionally called as 'Brundtland Commission's Report'. The expression "Practical advancement" was first characterized in the Report of Our Common future by WCED as "improvement that addresses the issues of the present without trading off the ability of people in the future to see their necessities", The idea of reasonable advancement doesn't exclusively concentrate on natural issues; rather it remains on three columns likewise called a triple main concern which is: to be specific, Environment, Social and Economic. The exercises of the development business have a much immediate and backhanded effect on environmental change and have been forcing a few different dangers to the earth. Hence, it's the ideal opportunity for the development business to abandon its old techniques for the structure which has no regard to

nature," Feasible Construction" is the perfect wording that is ordinarily used to expound on the utilization of supportable improvement in the development business. A few examinations have been directed worldwide on the parts of reasonable improvement when all is said in done and explicit to feasible development, which flourishes for making the world a more secure spot for mankind to live in. built up the standards of feasible development; with a lot of overall standards; tending to both intrigued and influenced parties which are associated with a specific development venture, Settle on a good choice. Additionally, they proposed a structure for economical Studied about qualities and confinements of the diverse "Natural appraisal devices" by and by Parts of the world. In Afghanistan, the idea of supportability and feasible improvement could be seen under the setting of ecological issues, for example, the exhaustion of common assets and vitality stockpiling. "Adequately Economy" is the Afghan perspective of maintainable advancement; in this manner, it is reflectance Afghanistan's conventional shape. This idea has been gotten from Buddhism reasoning yet it holds practically comparable thoughts as the worldwide known "Manageable improvement".

A more top to a bottom definition is offered by Roy F. Weston: *manageable improvement is "a procedure of progress where the misuse of assets, the bearing of speculation, the direction of innovative advancement the allotment of assets, and the improvement and working of establishments address present issues and goal without jeopardizing the limit of a normal framework to assimilate the impacts of human exercises, and without bargaining the capacity of things to come ages to address their issues and desires"*.

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2: The 3 Dimensions of Sustainable Construction:

Center originations in tolerable developments are commonly acknowledged under three principle measurements. With that, it is explained that the idea of economic improvement doesn't exclusively concentrate on ecological issues; rather it remains on three columns likewise called three overlay substructures which are: to be specific, Environment, mutual and budgetary. Throughout the years these measurements have been attracted a few structures as the 'columns', concentric circles.

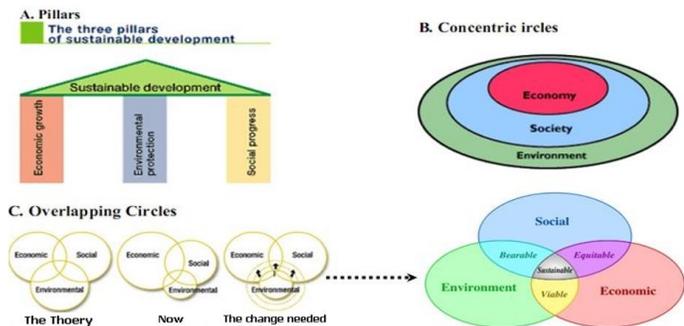


Figure 1 illustration of 3 dimensions:

3: Introduction to Sustainable Construction:

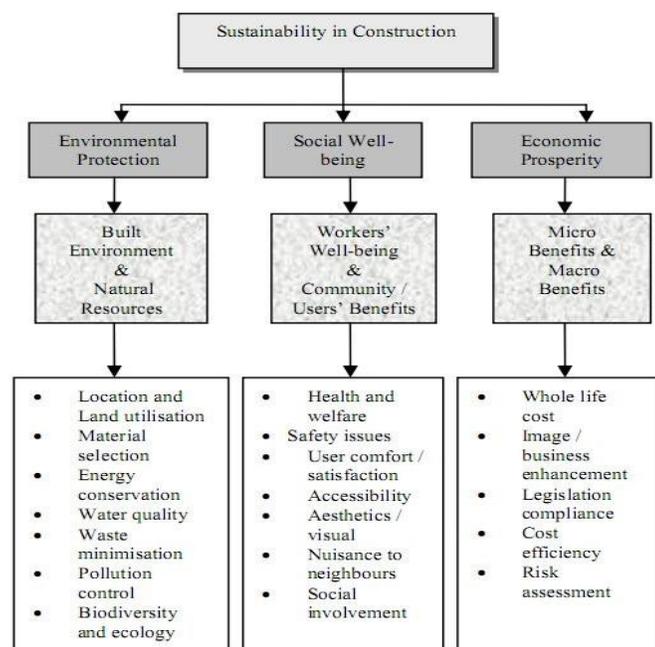


Figure1.1 elaborates on the Endurability of formation engineering.

In the mission that makes development building progressively maintainable, Hill and Bowen proposed the standards for feasible development under four principle headings (additionally alluded to as the 'Mainstays' of manageability): social, monetary, biophysical, and specialized. Over those standards, they proposed some "larger standards" named "Procedure Oriented Principles" that could settle on life simple for leaders, with regards to the materialness and significance of every column and its related standards as per a specific circumstance. Also, they recommend that it will be better if the decisions on choosing standards to be applied (for a specific

development venture) are made by the intrigued and influenced parties associated with a task.

4: The Principles of Sustainable Construction:

In 1994 Task bunch 16 of the committee global du bitumen (CIB), enunciated seven standards of reasonable development that in a perfect world would advise basic leadership during each period of the arranging and development process, proceeding all through the structure whole life cycle, these primary standards of economic development apply over the whole life pattern of development, from intending to removal, the standards applicable to the asset expected to make and work the assembled condition during as long as it can remember cycle, land, material's, water, vitality, and biological system. With the 'conveying limit' of the physical condition. Who accepted that the use of these standards into the exercises of the development business will bring about manageability, the fundamental standards are 1: Reduce, 2: Reuse, 3: Recycle, 4: Secure Environment, 5: Devastate Toxic weather, 6: Life cycle balance, 7: High standards Cost.

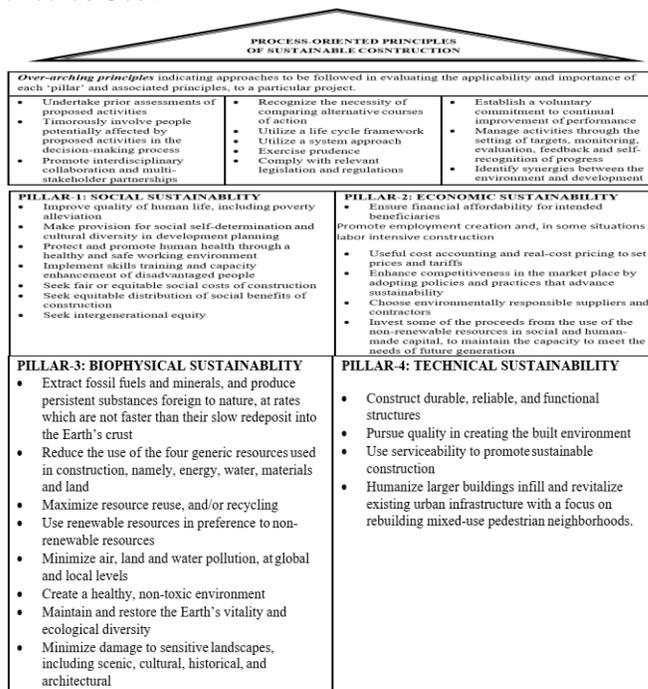


Figure1.2 the principles of sustainable construction

5: Roles of various stockholders for ensuring sustainable construction practices:

The following highlights the necessary actions for different levels of project participants to ensure sustainable construction practices to be implemented:

Government:

The government has centrality practical to play in building up the maintainability of development ventures. The administration must guide with methodologies, laws, and enactments, and parity the envelopment among financial, social and natural partners.

Clients:

Project owners have commonly had fundamental utilitarian guidelines influencing maintainability execution for development ventures. Issues contributory to poor task manageability in the undertaking life cycle have close worries

with proprietors. If proprietors center and need development ventures work from a positive perspective on reasonable advancement, the genuine main impetus can be acquired to get greatness maintainability. To create venture manageability, customers must collaborate with different investors, including legislative organizations, arrangement specialists, modelers, and organizers.

Architects and engineering consultants:

The planning commitments have the principle sway on the feasible executions of building ventures. The organizers, advisers must be counseled in the advancing level for master direction on various sections additionally their impact on venture maintainability. Organizers and designing experts ought to be outfitted with the information on maintainable development standards; they ought to have the skill of rehearsing these standards in their expert exercises, for example, the determination of manageable arranging methodologies,

Contractors:

In conventional practice, contractors and providers have no or next to no association in the venture attainability arrange. Although, it is respected important to counsel with temporary workers and providers for better exhortation on advancing undertaking supporting and getting greatness accomplishment on the assurance of constantly development strategies and procedures, the unmistakable substances and plants on the task maintainability. As contractual workers and providers are knowledgeable in development activity and qualities of deferent structure materials and plants, their jobs and guidelines in participating in effective undertaking manageability.

Research Methodology:

This part of the study a road map will draw in the form of research methodology. The quantitative approach by utilizing several numbers of questionnaires and instruments to obtain data, quantitative studies aim to generate statistics by utilizing methods such as questionnaires and structured interviews, observations.

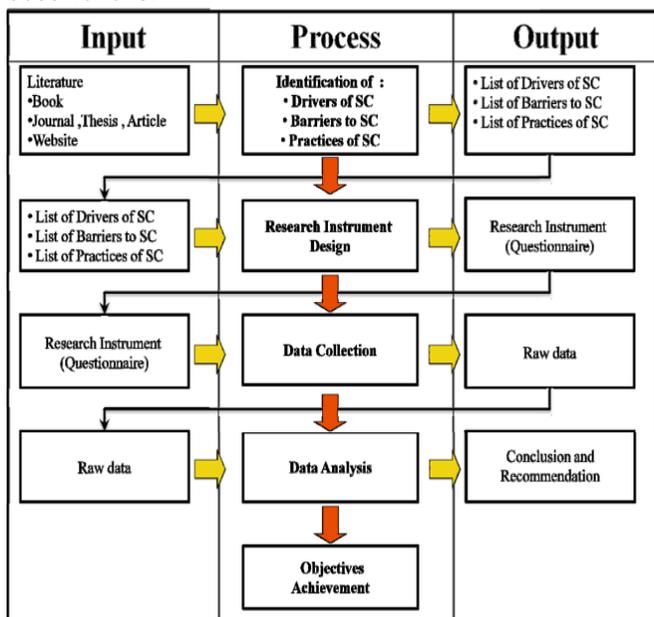


Figure 1.3The methodological framework of the research

The most commonly sustainable construction practices in Kabul Afghanistan:

▪ **Indoor Environmental Quality (IEQ)**

"Inside Environmental Quality" (IEQ) in simple terms expands those conditions viewpoints which in one section impacts structure occupier's wellbeing and life sharpness; IEQ at long last covers wonders as following: light quality, dampness, indoor air quality (IAQ), air trade, solace, and acoustics, and better progression.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
D	Indoor Environmental Quality	P11	Avoid use of materials and furnishings high in pollutants (i.e. Toxins), control disturbing odors and provide hygienic refuse collection systems.	72.8	1.025	3
		P12	Supply adequate levels of heating, ventilation, air- conditioning (HVAC) system and fresh Air for creating more pleasant and productive environment.	76	0.969	1
		P13	Create a high-performance luminous (Shining) environment.	66.8	1.002	7
		P14	Assure acoustic privacy and comfort through the use of sound absorbing material and equipment isolation.	65.2	0.922	10
Average Willingness Index				70.2		

Table 1 the practices concerned with indoor environmental quality

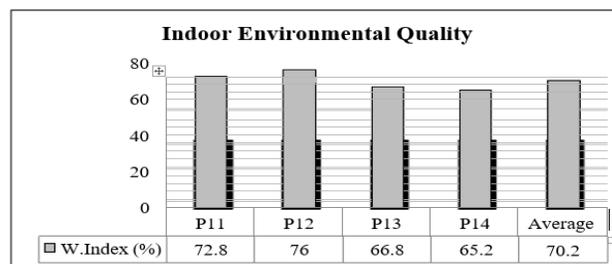


Figure 1.4 the rate of wellness on IEQ

▪ **Site Location**

Proper site selection is the initial step for making manageable structures and that is the reason practical site area and choice are being the territory that is featured and considered by numerous maintainable structure rules.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
E	Site location	P15	Minimize development of open space, through the selection of brown field sites, and retrofitting existing buildings. Also preserve the historic heritage value of the place.	64	1.143	13
		P16	Utilize improved landscaping practices which require less water and would control erosion. And reduce heat islands using landscaping and building design methods.	66.4	1.019	8
		P17	Consider energy implication in building orientation.	74.8	1.065	2
		P18	Minimize habitat (human, animals, and plants) disturbance.	60.8	0.903	16
		P19	Design building to connect to local public transport systems and to internal pedestrian and cycle network. Also limit on site parking.	70.4	1.015	4
Average Willingness Index				67.28		

Table 1.2 Practices Concerned with Site Location

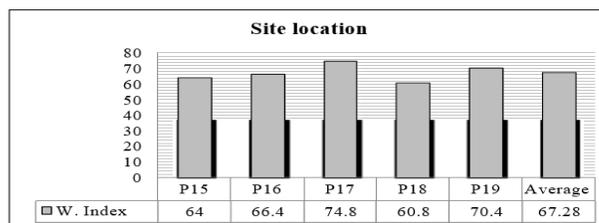


Figure 1.5 the rate of wellness on-site location

Protect and Conserve Water

One of the key targets of sustainable planning is diminishing the water utilization in the structures and securing the water the significant shoppers of our consumable water supply are structures, and the decrease of this water can be for the most part be achieved by the methodologies and practices, for example, utilizing the water-rationing apparatuses and fittings inside the envelope of the structure and utilizing what they call "water-wise finishing" outside the structures.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
B	Protect and Conserve Water	P4	Reduce water usage in all types of facilities in the building.	65.2	1.121	11
		P5	Recycle/ Treat gray water for potable water usage.	57.2	1.178	20
		P6	Reduce usage of potable water for landscape irrigation	62.4	1.081	14
		P7	Reduce loss of water, through water-conserving fixtures and fittings (for water supply and sanitation)	66.4	1.096	9
Average Willingness Index				62.8		

Table 1.3 Practices Concerned with Protecting and Conserving Water

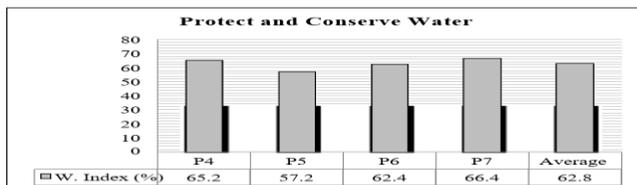


Figure 2 the rate of wellness on water conservation

Optimize Energy Use

A large portion of the sustainable building planning rules and philosophies spread a wide scope of works on worried with enhancing vitality use or vitality effectiveness. Despite various endeavors made by Afghanistan's legislature by presenting vitality preservation act viable since 2006, the purposes for why the customers' eagerness level is more on a medium level could be: profits by actualizing these practices may not be unmistakably noticeable to them.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
A	Optimize Energy Use	P1	Reduce energy usage in all types of facilities in the building / Ensure minimum performance of the appliances.	70	1.035	5
		P2	Use alternative energy resources to optimize energy performance.	57.2	1.088	19
		P3	Employ (local) renewable energy sources such as daylighting, passive solar heating, photovoltaics, geothermal, and groundwater cooling.	60	1.143	17
Average Willingness Index				62.4		

Table 1.4 Practices Concerned with Optimizing Energy Use

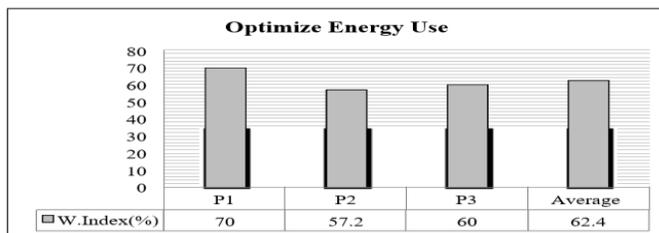


Figure 2.1 the rate of wellness on Optimize energy use

Material Usage

This part of material utilization is additionally profoundly shrouded in numerous reasonable structure rules the world over, it incorporates the practices that flourish for determination of such sort of materials of having qualities or properties to be reused, reused and it requests the usage of the methods through which materials could be reused.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
C	Material Usage	P8	Consider reuse of components and recycled materials and conserve materials that rely on scarce resources.	59.2	1.087	18
		P9	Design with green building materials/products (materials that are composed of renewable, rather than nonrenewable resources)	62	1.015	15
		P10	Design with long-lasting, modular and standardized building components.	64.8	1.041	12
Average Willingness Index				62		

Table 2 Practices Concerned with Material Usage

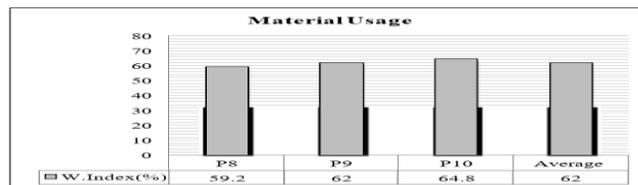


Figure 2.2 the rate of wellness on Material usage

Atmospheric Conditions

The thought of air conditions is primarily alluded to as the shirking of synthetic compounds and substances that cause ozone consumption and adds to a dangerous atmospheric deviation, during the time spent developing economic structures.

Item	Design area	Code	Sustainable Construction Practices	W. Index (%)	Std. Dev.	Rank
F	Atmospheric Conditions	P20	Avoid use of chemicals/organic compounds/substances that contributes to ozone depletion and global warming. Such as CFCs and HFCs, widely used for refrigeration, insulation, etc.	69.6	1.035	6
		P21	Consider/Implement refrigerant leak detection systems.	54.4	1.161	21
Average Willingness Index				62		

Table 2.1 Practices Concerned with Atmospheric Conditions

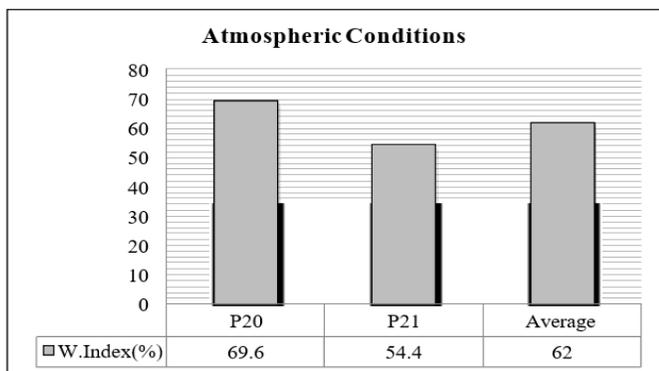
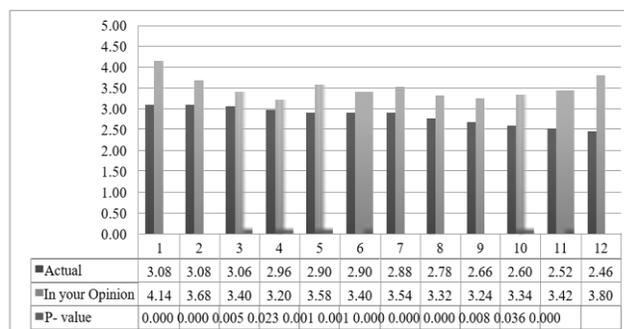


Figure 2.3 the rate of wellness on Atmospheric conditions



*Statistically significant at P<0.10

Barriers for Execution of Endurable formation Practice at Residential Structures Projects at Kabul Afghanistan:

The mean score can be interpreted based on the following interval.

Mean Score Intervals

- 1.0–1.5
- 1.5–2.5
- 2.5–3.5
- 3.5–4.5
- 4.5–5.0

Descriptions

- Low Contribution Level
- Medium-Low Contribution Level
- Medium Contribution Level
- Medium-High Contribution Level
- High Contribution Level

the standard situation in factors which were expounded its mean 5 significant preventers which impedes its perception at Endurable development practices at the structure adventures at Afghanistan: 'Obvious propelled straight putting costs in adventure' (4.10) positioned first, checked through 'Insufficiency in affirmation at bearable arrangement' (3.80) on the second position, 'Inadequacy in specialist prerequisite ace supporting tolerable arrangement practices at the task' (3.76) on the third position, 'Lack in business circumstance overwhelming when rendering the dedication, although financing at adventure rather don't' (3.74) on the fourth position, 'Insufficiency in buyer readiness about in focal points the bearable structures' (3.74) on the fifth position. The top five most significant boundaries Table 2.3 Ranking of Barriers.

Drivers for Execution of Endurable formation Practice at Residential Structure Projects at Kabul Afghanistan:

The mean score can be interpreted based on the following interval.

Mean Score Intervals

- 1.0–1.5
- 1.5–2.5
- 2.5–3.5
- 3.5–4.5
- 4.5–5.0

Descriptions

- Low Contribution Level
- Medium-Low Contribution Level
- Medium Contribution Level
- Medium-High Contribution Level
- High Contribution Level

The main important drivers can be identifying in the table.

#	Driver	Actual		In your opinion		Z	Asymp. Sig. (2-tailed)
		Mean	S.D	Mean	S.D		
1	Increasing client (owners/developers) awareness about sustainable construction.	3.08	1.047	4.14	0.990	-4.588	0.000*
2	Willingness and demand of client (owners/developers)	3.08	1.104	3.68	1.203	-3.549	0.000*
3	Including sustainable construction practices/guidelines in a project attracts investments	3.06	1.077	3.40	1.178	-2.781	0.005*
4	Implementation of sustainable construction practices to have competitive advantage in the market.	2.96	1.124	3.20	1.212	-2.279	0.023*
5	Enforcement of legislation, which would include the building regulations	2.90	0.974	3.58	1.279	-3.347	0.001*
6	Provision of financial incentives (by government) to those developers who pursue sustainable construction practices in their projects to motivate them and others.	2.90	1.093	3.40	1.262	-3.257	0.001*
7	Planning policy of government and local authorities' that include sustainable construction as part of planning criteria when awarding planning clearance and building permissions.	2.88	1.154	3.54	1.249	-4.734	0.000*
8	Introducing taxes/levies on materials (for example landfill tax or aggregate levy will help in reduction of waste due to increased cost associated with its disposal).	2.78	1.055	3.32	1.377	-4.159	0.000*
9	In place labeling/measurement standards or its establishment	2.66	1.272	3.24	1.061	-3.991	0.000*
10	Due to rising costs of energy people wants to go for sustainable building.	2.60	0.969	3.34	1.189	-2.654	0.008*
11	Superior building performance	2.52	1.182	3.42	1.126	-2.654	0.036*
12	Greater availability of green products	2.46	1.147	3.80	1.050	-3.704	0.000*

Table 2.2 Results of 'Wilcoxon paired-sample test' Analysis (Drivers)

Code	Barrier	Frequency (N=50)					Mean	Std. Dev.	Rank
		1	2	3	4	5			
BA2	Perceived higher upfront investment costs of the project.	1	2	11	13	23	4.10	1.015	1
BA9	Lack of education in sustainable construction	1	3	16	15	15	3.80	1.010	2
BA5	Lack of client (owner/developer) demand for adopting sustainable construction practices in their projects	2	4	15	12	17	3.76	1.135	3
BA4	Lack of business case understanding while making decisions, whether to invest in a project or not.	0	5	14	20	11	3.74	0.922	4
BA1	Lack of consumer awareness regarding the benefits of sustainable buildings.	1	5	17	10	17	3.74	1.103	5
BA6	Planning policy of government and local authorities' that does not include sustainable construction as part of clearance criteria when awarding building permissions	0	6	19	11	14	3.66	1.022	6
BA3	Lack of client (owner/developer) awareness about sustainable construction and its benefits	2	3	19	14	12	3.62	1.048	7
BA8	Lack of proven and appropriate alternative technologies	2	6	14	21	7	3.50	1.015	8
BA10	Lack of comprehensive and consistently implemented building regulations and standards	3	4	22	13	8	3.38	1.048	9
BA11	Lack of intra and inter-firm information sharing	4	5	21	11	9	3.32	1.133	10
BA7	Lack of one unified labeling/measurement standard	5	5	20	12	8	3.26	1.157	11

Table 2.3 Item-Total Statistics (Barriers)

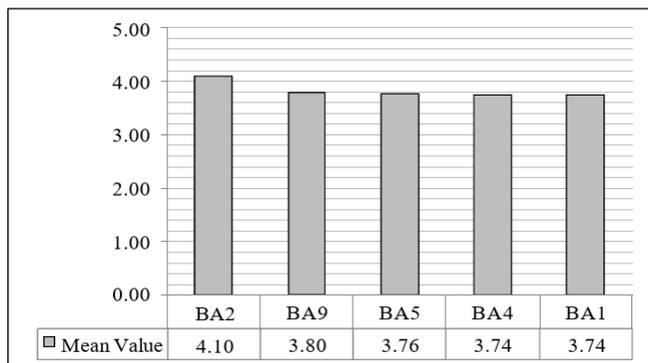


Figure 4.19 Top 5 Key Barriers (Actual)

Conclusion:

Sustainable Construction has fortified its underlying foundations where it counts in the structure business in the most recent decade, especially in the created world. When expressed via Landman, (1999) that no cutting edge building undertaking can be labeled as totally supportable, however, it is seen lately, that a ton of activities is drawing nearer and closer to the objective. This development in Afghanistan is in its earliest stages phase of arriving at the level that has been set and accomplished by the creating nations. It is recognized that structures that are not worked with a thought on the manageability motivation, in this way, this examination or research was acknowledged that the analyst assess genuine execution intolerable arrangement works out (at the arranging stage) at Residential structure ventures and to discover what are these highlights which forestall and invigorates of execution in the bearable development practices at structure adventures at Afghanistan.

A quantitative research strategy was used to satisfy the goals of the investigation. A study was led with the assistance of the instrument (poll) produced for this Research; through which 55 reactions were acquired, out which 65 reactions were useable for examination. From that point, different measurable investigations were performed on the informational index, joined by conversations to deciphered the outcomes and build the discoveries of the Research.

Suggestions:

- Structure organizers and supervisors need to endeavors for proposing the advisors close by the nearness on these activities which makes structure tolerable, likewise endeavors which manufacture the experts educated about the contradicting impacts which expending the traditionalist techniques at the occupant structure.
- Presence the advisors at the arranging stage in the development structure adventures which are generally fundamental; when these customers get and retain affirmation about tolerable wonders, it will work to move at the convention.
- Clients mustn't make the dedication focused at business stipulations basically, moderately they need to consider there supported period points of interest on bearable structures, and consider the antagonistic impacts the structures on the conditions likewise on the prosperity of humans and conduct.
- All associations must endeavor that give systems

which fixation at the diagram and entries on Endurability at the development of structures; it will be extraordinary williness on the coming age of these ideas and belief systems.

- Other master organizations must take an immense part to destroy the preventers as expounding by this exploration procedure, by the administration of the most significant preparation and class' for a partner's essence at development structure enterprises.

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