Tailored Strategies to Onboard the Key Stakeholders to Spur the Uptake of Mass Timber in East Africa

With a behavioral science lens applied
Context and Purpose

To demonstrate the full climate potential of forests and sustainable forest products

The Climate Smart Forest Economy Program (CSFEP) is a collaborative initiative bringing together EIT Climate-KIC, The Nature Conservancy, the World Economic Forum, and the World Resources Institute, with seed funding from Good Energies Foundation and support from Dalberg Catalyst. The overarching goal of the program is to demonstrate the full climate potential of forests and sustainable forest products and catalyze further momentum and investment into the sector. The program aims to increase the use of climate smart forest products by catalyzing market demand from sectors that need rapid decarbonization (such as construction), while meeting social and ecological safeguards.

To strengthen demand and CLT manufacturing in Kenya, Tanzania, and Uganda

"Developing a Climate Smart Forest Economy in East Africa", one of the emblematic breakthrough initiatives that demonstrate the potential identified and supported by CSFEP, was approved in June 2021, in partnership with BuildX and Gatsby Africa. The initiative aims to strengthen demand and CLT manufacturing in Kenya, Tanzania, and Uganda, assessing the overall climate, environmental, and socioeconomic opportunities and risks of a climate smart forest economy in East Africa.

To understand barriers to unlocking the demand for wood buildings in the market

Local leadership in East Africa (EA), a construction hub over the coming decades, is already positioning the region as a hub for mass timber, seeking to serve emerging demand in Kenya and to assess long-term environmental and climate opportunities. BuildX Studio, an innovative architecture, engineering and construction company in Kenya, is spearheading support to mass timber manufacturing and construction in Kenya and assessing regional supply opportunities. Busara Center for Behavioral Economics, headquartered in Kenya, is a research and advisory firm that dedicates to advancing and applying behavioral science to design solutions for partner organisations that are working to make lives better in the Global South in the Global South. As a research partner, Busara is leading a behaviour change study focused on understanding barriers to unlocking the demand for wood buildings in the market.
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Executive Summary
Perception of mass timber

Mass timber is not a familiar concept to most of the respondents interviewed in Kenya, Uganda and Tanzania, including developers, professionals in the build sector, and end consumers. Even though slightly more than half of them claimed that they had heard of it, few could tell the difference between timber and mass timber.

When asked about their perceived benefits of building with mass timber, they associated their experience with wood building and spoke highly of the ease in construction, time saving and profitability, aesthetics, and versatility. They believe that mass timber is much lighter and easier to be installed compared with the predominant building materials like concrete and steel. It allows for easier and faster construction, which means time saving, shorter project period, less staffing cost, and more profits for the project. A couple of respondents mentioned that mass timber as a recyclable material is expected to save cost in the long run. They believe that mass timber brings with it a modern, sleek aesthetic that makes a building more attractive and inviting. Versatility is another advantage perceived that mass timber can be adapted to various weather and natural conditions.

Of note, they shared mixed perceptions towards the environmentally adaptiveness and sustainability of mass timber. Some assert that mass timber is an environmentally-friendly material, as it requires less energy to produce and emits fewer pollutants than other construction materials. Furthermore, due to its reusability and recyclability, mass timber is seen by them as an eco-friendly option. However, others remain skeptical, citing the potential for mass timber to contribute to accelerated deforestation in countries such as Tanzania and Uganda.
When asked about the disadvantages of and concerns around mass timber adoption in their contexts, the respondents brought up the availability of materials, technology, and trained local professionals, the durability and safety, and extra cost for maintenance. In East Africa, there are limited trained professionals who master the technical know-how of mass timber given that it is a new technology. They further shared the concern on the sustainable supply of mass timber, given the policy regulation on deforestation in Kenya and the authority of the Tanzania government in regulating and controlling the build sector. Meanwhile, some respondents questioned whether mass timber is durable and safe. They worry that it could be susceptible to certain insect infections, not resistant to water or extreme weather conditions, and not as fire resistant. Moreover, some respondents expected mass timber to be expensive for maintenance including extra treatment for insect infestations and fire resistance.

Structural barriers to mass timber adoption in East Africa

Potential structural barriers to mass timber adoption in East Africa can be divided into several distinct issues. According to developers and professionals in the build sector interviewed, there is a lack of affordable timber available, which is typically produced locally. This has been exacerbated by policies on deforestation, which increases the cost of using timber. In the East African market, developers and consumers are cost sensitive when choosing building materials or housing options. This attribute has been reinforced by the hard economy due to various factors including Covid-19 and the war between Ukraine and Russia. The latter is estimated to drive up prices and costs in the sector for approximately 30%. They pointed out that the cost of timber, particularly in Kenya, is highly fluctuating, which creates a significant obstacle for the key stakeholders in the sector to invest in.

Additionally, there is a lack of awareness among both consumers and construction professionals, which has hampered the adoption of mass timber construction. Moreover, there is a lack of local professionals with the right expertise, which has further impeded the uptake of this technology.
Informational barriers to mass timber adoption in East Africa

There are several informational barriers to the adoption of mass timber that need to be addressed. For starters, knowledge of mass timber is incomplete or inadequate for the local communities, most of whom are exposed to only what is available locally. Lack of relevant knowledge is partly attributed to the change in the educational system that carpentry has been removed from high school curriculum, making it difficult for people to be aware of the capability and benefits of timber being a structural material. This further results in confusion and misinformation surrounding the use of this resource, such as the false notion that consuming timber leads to deforestation.

Psychological barriers to mass timber adoption in East Africa

There are numerous and varied psychological barriers to mass timber adoption.

**Heuristics:** Availability and affect heuristics play a key role, which refers to negative impression of wooden buildings from the past experience, or negative emotion associated with mass timber coming from lack of information or misinformation about timber products being the reason for deforestation. Some respondents further expressed their concern about the environment and potential mass timber adoption.

**Inertia:** Especially for developers and professionals in the build sector, they are comfortable to follow how construction has been done in the past and would not bother to research for new building materials.

**Lack of trust:** Seeing is believing, and choices are made based on things seen personally or tested over time. However, people in these markets have not seen or known long lasting wood architecture and technique.

**Herd behavior:** People tend to choose what others have chosen. When there are sufficient number of others who chose mass timber housing or commercial buildings, they would consider that as a safer investment, or a socially approved choice.
Social norm: Social norms signal appropriate behavior and are classed as behavioral expectations or rules within a group of people. When making decisions, people are influenced by the culture, tradition, what others consider appropriate, what others might judge. Wooden buildings are often associated with lower socioeconomic status or housing for poor people in these countries.

Stereotype: In the current context, timber has been largely used for interior design but rarely regarded as a structural material in the locality.

Risk aversion: Building for large scale projects bears considerable costs and risks, thus developers want assurance that use of mass timber would mitigate these risks and minimise costs.

Personas of key stakeholders

Four personas are identified among key stakeholders interviewed to help design tailored strategies to engage them:

Receptive Planners: They have been exposed to mass timber and construction projects overseas, and are most likely to be a developer. Primary barriers to them to adopt mass timber lie in the perceived high cost, and skilled workers and material that are locally available. To onboard Receptive Planners, add a sample of mass timber in hardware stores, and highlight the cost efficiency of building with mass timber.

Adaptive Followers: They are most likely to be an end consumer, who is influenced by trendy fashion and others’ choice of housing. They currently hold low trust in mass timber building because they have not been exposed to a local successful story of the kind. Meanwhile, the majority around them prefer housing built with traditional materials such as concrete, stone, and steels. Lack of the awareness further hinders them from exploring the option. Advertisement, mass education and reaction to misinformation is required to equip them with relevant information of mass timber. And local demostations with beautiful design and appearance will attract their attention.
Routine Executors: They are typically a professional in the build sector, or a developer. They are experienced in their professions, but have known little about mass timber. They are comfortable to continue building in the way they know, and they do not want to risk for a new material they are not familiar with, especially for large-scale projects. To onboard them, top-down, massive training and knowledge sharing will be effective. It is also recommended to involve in university students through internship to prepare future skilled professionals. Given their aversion towards risk and uncertainty, proper certificates of mass timber from the government are expected to instil confidence in its use.

Hesitant Sustainers: They can a developer, a professional in the build sector, or an end consumer. They are skeptical of using mass timber as a structural material, mostly because of their negative impressions associated with timber, misinformation, and lack of exposure to a local mass timber building. They will be encouraged by massive demonstrations, success stories, and samples that are locally available, as well as testimonies from well-known local engineers and architects.

Strategies to spur the uptake of mass timber

In the short-term, transparent information on the estimated costs of building with mass timber will help onboard Receptive Planners. Further, construct a mass timber building locally, inhabited by early adopters, to break misperception and to evoke the trust and acceptance. Start involving Routine Executors in training or mass timber projects.

In the mid-term, onboard more Routine Executors through the influence of Receptive Planners and continuous training and local construction projects. Rewrite the narrative of timber buildings through the local successful stories, attracting Hesitant Sustainers and Adaptive Followers.

In the long run, plan for partnership with the governments and sectoral associations to regulate the market for sustainable supply (e.g. avoiding monopoly) and industrial standards (e.g. certificates, policies). Equip the local professionals and artisans with the necessary knowledge and skills, and prepare more university students in related majors via apprenticeship.
Study Objectives and Methodologies
To understand barriers to the commercial adoption of mass timber in East Africa

Busara led a behavioral study with developers, end consumers, and construction entities in Kenya, Tanzania, and Uganda.
Methodologies

**Desk Review and Stakeholder Mapping**: we reviewed the current literature for factors that affect the uptake of sustainable and alternative forms of wood in the market, and mapped out the key stakeholders in the build market in East Africa, building the foundation for In-depth Interviews (IDIs).

**Behavioral Persona Creation**: insights from the IDIs are articulated to inform the creation of personas of key stakeholders, which differentiate from each other for their particular behavioral patterns (e.g. barriers, motivations) around mass timber adoption.

**In-depth Interviews (IDIs)**: based on the stakeholder mapping, we identified 3 key segments of respondents with whom we conducted in-depth interviews to unpack their perceptions, barriers, and levers to adopt mass timber. The 3 segments are: developers, professionals in the build sector (including architects, engineers), and end consumers.

**Behavioral Mapping**: we particularly examined the process of deciding building materials by professionals and developers, and mapped the structural, informational, and psychological barriers to mass timber adoption along the journey.
Sampling Strategy

Purposive Sampling

- Based on results from literature review and stakeholder mapping, we targeted to recruit in total 30 - 50 respondents, from three stakeholder groups:
  - Developers: 25 - 30
  - End consumers: 10 - 15
  - Construction professionals: 5 - 8
- To plan for feasibility, most of the respondents were recruited from Nairobi

Snowball Sampling

- Given the potential difficulties of finding sufficient numbers of eligible respondents under a tight timeline, snowball sampling was deployed to extend the pool of potential respondents.
- To start, Busara selected stakeholders identified by research partners to go through the eligible screening.
Study Sample

Three Segments
In total, 39 respondents were recruited, 74% from Kenya

Kenya
- 29 respondents
- 23 male, 6 female
- 15 developers (13 male, 1 female)
- 9 end consumers (4 male, 5 female)
- 5 construction professionals (all male)

Uganda
- 5 respondents
- All 5 are male
- 2 developers
- 2 end consumers
- 1 construction professionals

Tanzania
- 5 respondents
- All 5 are male
- 2 developers
- 2 end consumers
- 1 construction professionals
Although more than half have heard of mass timber, very few of them have used it or seen a mass timber building

### Developers
- Male: 18, Female: 1
- Kenya - 15, Tanzania - 2, Uganda - 2
- Average age 34, (26 - 49)
- With a master’s or university degree
- More than 50% heard of mass timber, 4 used it in projects, half have seen or known projects mass timber projects

### End Consumers
- Male: 8, Female: 5
- Kenya - 9, Tanzania - 2, Uganda - 2
- Average age 33, (22 - 52)
- Mostly with a college or university degree
- 7 residential buildings, 6 commercial buildings
- 3 of them had heard and seen mass timber

### Construction Professionals
- Male: 7
- Kenya - 5, Tanzania - 1, Uganda - 1
- Average age 34, (27 - 41)
- With university degrees
- 6 out of 7 have heard of mass timber
- 6 out of 7 have not used mass timber in their projects
Key Findings
The Ideal Future Market of Mass Timber

In the eyes of key stakeholders
What an ideal future market of mass timber in East Africa looks like

The key stakeholders described an ideal future market of mass timber where they could see themselves be part of:

1. Easy access to affordable materials: the mass timber should be easily accessible, ideally locally accessible, to ensure the stability of production cost and efficiency, predictability of market fluctuation, and profit margins.

2. Human capital and new technologies ready: there should be an adequate talent pool of local architects, engineers, and contractors who are equipped with necessary skills to build with mass timber. They should be trained and have adopted the new technologies.

3. Consumer-centred design: the mass timber building should be designed for consumers’ needs, including safety, resistance towards water and insects, aesthetic, and durability.

4. Available funds for start-ups: they expect to have funds available for start-ups who envision a future market of such to encourage the massive uptake and acceptance of mass timber.

5. Open platform for information: they find it extremely helpful to have an open platform where they can be exposed to design ideas, examples, and development of mass timber globally and can interact with and learn from the global construction community.

6. A regulated market with qualified key players of integrity, especially for Uganda: envision this new landscape of the sector, they hope for a market that is regulatity and operated with minimal bureaucracy and corruption.
Perception of Mass
Timber
Slightly more than half of the sample claimed to have heard about mass timber, but few people can tell the difference between timber and mass timber

Commonly, mass timber is perceived as a traditional material used with new technology. When asked for more details of what they knew of mass timber, most respondents associated it with their knowledge of timber, and believed that mass timber would simplify the process and time required for building, given that timber was much lighter than traditional building materials like concrete, stones, and steel. Some of the respondents regarded mass timber as a material more for interior design such as wall, floor and roof, rather than for structural construct.
Perceived advantages and benefits

Several advantaged were commonly mentioned when asked about their perceived benefits of building with mass timber.

**Ease in construction, time saving, and profitability**: mass timber is believed to be much lighter and easier to be installed compared with the predominant building materials like concrete and steel. It allows for easier and faster construction, which means time saving, shorter project period, less staffing cost, and more profits for the project.

- “*Timber is easier to assemble compared to concrete. It is light and easy to work with.*” - Male, Uganda, 35 yrs
- “*It’s easy to mould into various components like cabinets, it’s quick to work with.*” - Male, Kenya, 32 yrs
- “*It will be profitable because materials just need to be assembled, so I will use fewer people in a shorter period of time. The current projects that use concrete, sand, pebbles require lots of work and a long process.*” - Male, Tanzania, 35 yrs
Perceived advantages and benefits

**Environmentally adaptive**: A couple of respondents mentioned that mass timber is a recyclable material, which can also save the construction cost in the long run.

**Aesthetic**: Most of the respondents believe that mass timber can bring in a modern, appealing look to make the building more attractive.

**Versatility**: Some respondents believed that building with mass timber can tolerant various weather and and natural conditions, and thus can be adopted by different regions in their countries.

- “It solves a lot of heat problems: controlled temperatures are always very easy to achieve with wooden walls.” - Male, Kenya, 33 yrs
- “Buildings made of timber are categorised as semi-permanent here so it can be dismantled and put to use in some other place.” - Male, Kenya, 29 yrs
Mixed perceptions around its environmentally adaptiveness and sustainability

Of note, they shared mixed perceptions towards the environmentally adaptiveness and sustainability of mass timber.

Some assert that mass timber is an environmentally-friendly material, as it requires less energy to produce and emits fewer pollutants than other construction materials. Furthermore, due to its reusability and recyclability, mass timber is seen by them as an eco-friendly option. However, others remain skeptical, citing the potential for mass timber to contribute to accelerated deforestation in countries such as Tanzania and Uganda.

- “Timber can also be recycled and that makes it appealing.” - Male, Kenya, 32 yrs
- “The issue is deforestation. It is also difficult to get mature trees. The ones in the market are young. So the timber ends up being of low quality.” - Male, Kenya, 34 yrs
Perceived disadvantages and concerns

When asked about the disadvantages of and concerns around mass timber adoption in their contexts, the respondents brought up the availability of materials, technology, and trained local professionals, the durability and safety, and extra cost for maintenance.

**Limited availability around mass timber**: In East Africa, there are limited trained professionals who master the technical know-how of mass timber given that it is a new technology. They further shared the concern on the sustainable supply of mass timber, given the policy regulation on deforestation in Kenya and the authority of the Tanzania government in regulating and controlling the build sector.

- “That will mean cutting the forests again. My only concern is where the wood will be coming from. Is it readily available?” - Male, 27 yrs, Kenya
Perceived disadvantages and concerns

**Durability and safety**: Some respondents questioned whether mass timber is durable and safe. They worry that it could be susceptible to certain insect infections, not resistant to water or extreme weather conditions, and not as fire resistant.

- “Another thing is rotting and termites. Especially when the timber is not well treated.” - Male, Kenya, age unknown

**Extra Cost for Maintenance**: Some respondents expected mass timber to be expensive for maintenance including extra treatment for insect infestations and fire resistance.
Barriers to Adoption

Structural, informational, and psychological barriers
Structural barriers

- Lack of available and affordable (usually means locally produced) timber.
- Policies on deforestation, which increase the costs of using timber.
- Lack of the awareness among consumers and construction professionals.
- Lack of local professionals who have the right expertise.
- Cost of timber (especially for Kenya) that is fluctuating and increasing.

“I do not think we have enough forest to cover the kind of mass timber we are talking about.”
- Male, Kenya, 26 yrs

“Ban of logging that happens once in a while can stop an ongoing project that was majorly relying on timber. This causes the prices to go up.”
- Male, Kenya, 39 years

“An architect that has been designing using concrete and steel will find it difficult to use timber.”
- Male, Kenya, 39 yrs
Informational barriers

- Lack of information or knowledge about how to use it:
  - Knowledge of mass timber is incomplete or inadequate.
  - Especially true for the local communities (incl. developers and consumers) who are exposed to what are available locally
  - Partially due to the change in the educational system
- Misinformation that consuming timber leads to deforestation

"I have come across them but something you do not understand you do not even give interest in. If I had an opportunity to ask questions and see how they work, I could have considered them."
- Male, Kenya, 37 yrs

“Few years ago carpentry was part of high school learning. It is not happening today so people do not know how to approach timber as a structural item.”
- Male, Kenya, 39 yrs
Psychological barriers: heuristics

- Heuristics:
  - Availability heuristics: negative impression of wooden buildings from the past experience or memory
  - Affect heuristics: negative impression and emotion coming from lack of information or misinformation about timber products being the reason for deforestation
  - Some respondents expressed their concern on environment if there comes commercial adoption of mass timber

“The initial structures that were done with mass timber were never good, they failed because of the level of expertise with which they were done. So people shied off and that is what led to the inferiority of timber structures.”

- Male, Kenya, 33 yrs

“I don’t know much about it [mass timber] right now. If you don’t have information about it, you will think it is the mass timber production that is causing the deforestation.”

- Male, Kenya, 39 years
Psychological barriers: trust, herd behavior

- **Low in trust:**
  - Seeing is believing, choices are made based on things seen personally or tested over time
  - People in these markets have not seen or known long lasting wood architecture and technique

- **Herd behavior:**
  - People tend to choose what others have chosen (considered as a safer investment, or a socially approved choice)

"I would like to see where they have been used before. Like prefabricated materials that have come in so much especially on concrete. I have seen buildings and slabs using prefabricated concrete, and I know I can use them."

- Male, Kenya, age unknown

“Most people will use what they see being used by others. They will also use what they have been taught to use."

- Male, Kenya, 39 years
Psychological barriers: inertia, social norm

- **Inertia:**
  - Developers and professionals in the sector are comfortable with what has been done and not bothered to research for new materials.

- **Social norm:**
  - Social norms signal appropriate behavior and are classed as behavioral expectations or rules within a group of people.
  - When choosing housing, people are influenced by the culture, tradition, what others consider appropriate, what others might judge. Timber housers are associated with lower socioeconomic status.

- Mass timber information is available somewhere, it’s just that people don’t look for that specific information as we don’t have a habit of looking for new construction; we are used to the same available materials.”
  - Male, Tanzania, 35 yrs

- “In the western countries they have been building using timber. In Kenya the most common material is the stone wall even for interior partitions. People are used to it and it will be difficult to change.”
  - Male, Kenya, 37 years
Psychological barriers: inertia, social norm

- **Stereotype:**
  - Timber has barely been used and thus rarely regarded as a structural material in the locality

- **Risk aversion:**
  - Building for large scale projects bears considerable costs and risks, thus developers want assurance that use of mass timber would mitigate these risks and minimise costs
  - Proper certificates of mass timber from the government are expected to instil confidence in its use

"I have seen it used for floor, ceiling and kitchen cabinets. I have never seen a wooden building that holds beyond two floors."
- Female, Kenya, 29 yrs

“If you can prove professionalism in building with it and showcase buildings that have stood the test of time, that narrative can be changed.”
- Male, Kenya, 33 years

“First, it has to pass all the certifications like KEBS, the international standards and that just gives you some confidence that it has been certified by a body.”
- Male, Kenya, 32 years
Personas of Key Stakeholders
### Personas of key stakeholders

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<th>Characteristics</th>
<th>Receptive Planner</th>
<th>Adaptive Follower</th>
<th>Routine Executor</th>
<th>Hesitant Sustainer</th>
</tr>
</thead>
</table>
| **Key Barriers** | • Most likely a developer  
• Been exposed to mass timber and construction projects overseas | • Most likely an end consumer  
• Influenced by trendy fashion and others’ choices of housing | • Most likely a professional in the sector or a developer  
• Experienced in the sector, known little of mass timber | • Could be any of stakeholders  
• Skeptical of using mass timber as a structural material |
|                  | • Cost: cost-sensitive  
• Availability: locally available and affordable material and skilled workers | • Social Norm: majority’s opinion on timber houses  
• Herd Behavior and Trust: seeing is believing  
• Lack of Awareness | • Inertia: comfortable with the way it is  
• Risk and Uncertainty Aversion: especially with large scale projects | • Stereotype: of wood being structural material  
• Heuristics: negative impression, lack of exposure, misinformation |
| **Motivation and Vision** | • To save cost and shorten the construction period  
• To start with residential buildings | • Beautiful design and appearance, and:  
• Increased acceptance in local vicinities | • Long-term policy and certificates  
• To recycle: rapid or semi-permanent  
• Social buildings | • Proved to be locally adaptive and strong  
• To start with low-rise housing and lodging |

Note: personas highlights the key barriers to prioritize on while the practical scenario presents more challenges to overcome, which are illustrated in the following two slides.
Cost is what most developers look at. I have seen it being used for beams in Sweden. I know it has some structural capabilities.

Cost is most important. If you find a material is cheap, even if you will not buy it, you will start to consider it.

Cost
- Cost-sensitive, planning prioritized cost and profit margin
- Exposure to mass timber projects elsewhere has prepared him for adapting and localizing the idea, focusing on practical challenges.

Availability
- Willing to try it out as long as mass timber is readily available
- Concerned about the cost being high because it will be imported and workers are not familiar with the process of building with mass timber.

Motivation and Vision
- To save cost and shorten the construction period
- To reduce sound pollution when building
- Easy process of import
- Residential buildings: villas bungalows, and apartments no more than five floors

What Works
- Make it simple: add a sample of mass timber in hardware stores, so that they can easily compare the price and features of it with other materials
- Make it salient: highlight the cost efficiency when promoting it
It is not like people have been more receptive to concrete than timber. It is just that the trends have changed. In the previous times, it was almost unavoidable to use timber.

People consider wood as a building material for poor men. If I choose it, people will think my life moves backwards.

Social Norm
- The majority in the society living in the stone houses will look down on people living on a timber house

Herd Behavior and Trust
- Tend to choose what others have chosen as a safer investment or a socially approved choice
- Seeing is believing

Lack of Awareness
- Not able to make a decision if not knowing there is such an option

Motivation and Vision
- Beautiful design and appearance
- Affordability
- Increased availability and acceptance in local vicinities
- Starting with residential buildings

What Works
- Advertisement and massive education to increase the awareness and spread the knowledge of the materials
- Create demos and build projects locally, allowing them to see and hear what others are thinking
- React to negative criticism and misinformation on social media about the use of timber for building with (scientific) evidence
Mass timber information is available somewhere, it’s just that people don’t look for that specific information as we don’t have a habit of looking for new construction. We are used to the same available materials.

Stone and concrete are available and cheap. So they will ask why to bother if they can get concrete and machine-cut stones affordably.

**Erick, 31**

**Routine Executor**

- Most likely a construction professional or a developer
- Education: Bachelor or Master degree
- Possibly have heard of mass timber, but know very little of it
- Have been in the sector for 5+ years, familiar with what have been used and how

**Inertia**

- Comfortable with what has been done and not bothered to research for or learn about new materials
- No urgency to change if the current materials stay cheap and available

**Risk and Uncertainty Aversion**

- Considerable risks and uncertainty (e.g. how and whether can get all required certificates) need to be taken in to account when adopting mass timber, especially when building large scale projects

**Motivation and Vision**

- Proper certificates provided by the government
- Long-term policy established
- Able to recycle the materials
- Semi-permanent or rapid construction
- Social buildings like churches and schools

**What Works**

- Push through a top-down or a sponsored massive training and knowledge sharing (e.g. seminars, recreational activities)
- Training at the university level (e.g. internship projects)
- Make the process of obtaining certificates and information resources easily accessible
“Trees break, catch fire. Telling people the same material is strong and durable will not be easy.

If an engineer tells you that this is strong enough, they have approved it, then you are likely to believe so.

Timber is used for flooring, walling, and cabinets - for that I will adopt.

Fredrick, 36

Hesitant Sustainer

- Could be a construction professional a developer, or an end consumer
- Education: University degree
- Do not know mass timer
- Skeptical of using mass timber as a structural materials

Stereotype

- Wood easily breaks, is prone to fire, not resistant to rain and insects
- Timber has barely been used and thus rarely regarded as a structural material in the locality

Heuristics

- Availability heuristics: negative impression of wooden buildings from past experience or memory
- Affect heuristics: negative emotions and impressions from misinformation that timber products are the reason for deforestation

Motivation and Vision

- Affordability
- Proved to be locally adaptive and strong
- Low-rise housing
- Lodging (e.g. in game parks)
- Housing in the coastal areas, where steel get rusted

What Works

- A lot of demonstrations, a lot of success stories, a lot of samples that are locally available
- Obtain the buy-in from well-known local engineers and architects, use their testimonies
In a more practical scenario working with receptive planners, routine executor, and hesitant sustainers: strategize and prioritize
Call to Action to Spur the Uptake
To effectively evoke the uptake of mass timber among key stakeholders, strategies should be tailored per persona according to their key barrier:
Given different period and scope of implementations, strategies are outlined below for the short, medium and long runs:

**Short-term**

- Be transparent on the estimated costs of building with mass timber to onboard Receptive Planners
- Construct a mass timber building locally, inhabited by early adopters, to break misperception and to evoke the trust and acceptance
- Start involving Routine Executors in training or mass timber projects

**Medium-term**

- Onboard more Routine Executors through the influence of Receptive Planners and continuous training and local construction projects
- Rewrite the narrative of timber buildings through the local successful stories, attracting Hesitant Sustainers and Adaptive Followers

**Long-term**

- Regulate the market for sustainable supply (e.g. avoiding monopoly) and industrial standards (e.g. certificates, policies)
- Equip the local professionals and artisans with the necessary knowledge and skills
- Prepare university students in related majors via apprenticeship
Appendix

For more detailed findings
Key Takeaways from Desk Review
The following factors affected the uptake of sustainable and alternative forms of wood in the market

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<td>Negative perceptions of cost involved, stability and using greener alternatives</td>
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<td>The global nudge towards sustainable alternatives</td>
<td>Structural barriers related to government support and high insurance and banking costs</td>
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<td>Reduction in overall cost in procurement, speed of construction, maintenance</td>
<td>Lack of awareness and information, training and support for new materials</td>
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<tr>
<td>Increase in time and cost saving innovations and technology around wood</td>
<td>Concerns about quality and durability of building based on weather durability, fire hazard and flooding</td>
</tr>
<tr>
<td>Extensive lobbying by government and gradual access to green finance</td>
<td>Stigmatised and rigid culture in the construction industry - “wood as the poor man’s building material”</td>
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</table>
There were 5 main **behavioural motivators** of the uptake of wood

<table>
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<tr>
<th>Pro-environmental values and concerns regarding sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aesthetic and affective values of wood in generating positive emotions</td>
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<tr>
<td>Social desirability and the norm of sustainability</td>
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<tr>
<td>High perceived value of a sustainable building for both developer and buyer</td>
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<tr>
<td>Positive perceptions and interest in trying out a new alternative</td>
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</table>
But there were behavioural barriers which prevented it’s uptake as well

**Ambiguity Aversion**
Individuals preferred to choose the option where the outcomes are known, even if it guaranteed to be worse.

**Loss Aversion**
Individuals prefer avoiding the loss, even if there is a perceived loss involved. Here the loss is associated with perceptions of wood itself.

**Path Dependency**
There is a tendency to follow a pre-existing set path. Here this is in terms of using the same materials and established practices, as used historically, to develop buildings

**Anchoring**
Estimates are made based on applying a known reference value even when it may not be applicable. Here the reference point is steel and concrete as construction materials. Similarly cost perceptions of sustainable alternatives are based on solar panels.

**Risk Aversion**
Individuals avoid opportunities or circumstances which involve taking a change, there is a preference for more certain outcomes

**Affect Heuristic**
When individuals rely on a good or bad feeling in relation to a situation to make decisions. Here questions of stability, durability and safety of wood structures affects these decisions

**Status Quo Bias**
Preference to avoid challenging the norms of the surrounding culture. Here using alternative materials breaks the norm since there is a rigid and stereotypical preference against wood in the construction industry.

**High Effort Perceptions**
The learning curve to understanding the use of wood is high and involves time
The following gaps were present in literature:

Limited sample sizes and are not in-depth analysis rather a high-level overview and landscaping

Most given recommendations of awareness are solutions the participants are aware of but do not act upon

Non-common motivators other than cost reduction which have been studied in limited capacity

The action-intention gap and forming of perceptions without any actual experience is a major missing question
Based on this desk review, we identified certain touch points within the forest economy market for research to engage with:

- Developing awareness and encouraging training with new materials
- Increase observability of alternatives in the market through case studies, early demonstrations and use-cases
- Increase informativeness of the new product
- Use the framing effect to address perceptions and social preferences surrounding use of wood
- Address misinformed perceptions surrounding durability, reliability and quality of the materials
- Encourage agency of different stakeholders in making the decisions towards sustainability
Servicing as the guidance for Busara’s sampling, this Stakeholder Map focuses on the demand side. The closer to the Key Actors on the map, the more direct influence the stakeholders have on key actors’ decision making.
Current Construction
Section in East Africa
The construction industry is like the perfect cocktail

End consumers’ preference and purchasing power decide the demand of the housing, while the following key playings decide what types of housing are available:

<table>
<thead>
<tr>
<th>Professionals (architects and engineers)</th>
<th>Constructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developers (cooperatives and individuals)</td>
<td>Suppliers</td>
</tr>
<tr>
<td>Financial institutes (banks)</td>
<td>Governments</td>
</tr>
</tbody>
</table>

“The construction industry is like the perfect cocktail. There are the professionals, contractors and suppliers - if either one of them fails to play their part, there will be problems.”

- Male, Kenya, 27 yrs
Government plays an essential role in Tanzanian market

Particularly in Tanzania, the government is the predominant player, along with its agencies

Government acts as a regulator, control agency and coordinator.

CRB (Contractors Registration Board): deals with contractors and their activities.

All engineers need to be registered through ERB (Engineers Registration Board), and their activities are supervised by ERB.

AQRB (Architect Quantity Surveyor Registration Board) monitors all projects and who carry out the projects.
The sector has been and will continue to expand rapidly even in semi-urban areas

Hard economic times: prices of materials steel and concrete and transportation have gone up. It is estimated that the average cost has increased 30% in Kenya.

- But there might be an issue of oversupply, which partially contributes to the credit issue that some developers are not able to repay the loans.
- Meanwhile, the speed of growth has slowed down due to Covid, hard economic times, increased prices of inputs, which is partially because of the war in Ukraine and Russia.
The estimated ratio of residential buildings to commercial buildings is 70-30

- Main commercial building include: office spaces, retail spaces (shops and malls) and rentals (bungalows, apartments and maisonettes).
- High-rise buildings are becoming the domain. It is estimated that most of the high-rise kind in the following few years will be residential buildings.
  - Most of the high-rise and commercial buildings are constructed by foreign developers such as Chinese companies.

“For the high-rise and most of the commercial buildings, I have seen encroachment of the expatriates into this sector like the Chinese, and these days they take a lot of the high-rise buildings and most of the government and bank building construction. The local developers have not really ventured into high rise buildings.”

- Male, Kenya, 33 yrs
Construction is still and will likely continue being done in the traditional way

- There is an increase in demand for affordable housing which is seeing a shift in construction towards more affordable housing, particularly for residential buildings.
- Serviced apartments for hotel and tourism are dominant in the coastal regions.
- Corrupted system and poor planning in Kenya and Uganda: numerous unregulated construction are ongoing in Kenya; driven by profit and pocket money, unqualified developers are approved by the government in Uganda to enter the local market.

“Construction is traditional. We rely on what the colonialist left us.”
- Male, Kenya, 29 yrs

“We are trying to do affordable houses in Buruburu and from our research we have found that demand for affordable housing is high. That is why we have diversified into that market.”
- Male, Kenya, 32 yrs
Kenya is more driven by private actors, compared to Tanzania

- Particularly about Tanzania, it is moving from filling books towards a digital system, managed by the government through its agencies.
- Particularly about Uganda, there is a concern on the corrupted system that policies and plans are not followed, and that quality of buildings are compromised to lower the costs.

“Through this, a lot of energy is saved, and only very few things are taken care of on paper but we can say we are adopting modern ways of construction.”
- Male, Tanzania, 35 yrs

“Our worries are people are going to die because of how people are putting up buildings nowadays. They are not looking at quality but cost. When bidding, they are not looking at the quality but at the bidder offering the lowest cost.”
- Male, Uganda, 41 yrs
Overview

Influential Factors

Currently Popular Materials

Why They Are Popular
Notable phenomena and influential factors

**Foreign Developers**

Availability and affordability of (imported) materials along with availability of sophisticated machinery give Chinese companies competitive advantages.

**Local Expertise**

Lack of up-to-date expertise among the local construction communities hamper them from competing in the high-rise and new types of construction.

**Government Power and Policy**

Tanzania: government controls and coordinates all construction activities, leaving adoption a top-down process.

Kenya: ban on scrap steel makes it expensive; policies on logging increases the cost for using timber.
Overview

Influential Factors

Currently Popular Materials

Why They Are Popular
Overall, steel and concrete are still the most dominant materials used in the current build environment.

- **Steel**
  - Brick
- **Concrete**
  - Natural stone (incl. limestone)
  - Sand
- **Timber**
  - Mostly for roofing, and poles
- **Iron (sheets)**
- **Glass**
- **EPS**
- **Tiles**

- EPS: Expanded Polystyrene Systems, catching up
Overview

Influential Factors

Currently Popular Materials

Why They Are Popular
Availability, cost, and aesthetics are the top reasons why these materials are popular

<table>
<thead>
<tr>
<th>Reason</th>
<th>Quote</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easily available, most can be found locally</td>
<td>“They are readily available, they have been tried and tested and clients have seen the work. A lot of &quot;fundis&quot; know how to work with them.”</td>
<td>Male, Kenya, 29 yrs</td>
</tr>
<tr>
<td>Economical, affordable, profitable</td>
<td>“It’s cheaper compared to other materials, especially using concrete, which is cheaper than using steel structures for steel buildings.”</td>
<td>Male, Tanzania, 35 yrs</td>
</tr>
<tr>
<td>Aesthetics (e.g. timber provides nice finishing)</td>
<td>“Because they are basic in building a strong foundation.”</td>
<td>Male, Kenya, 32 yrs</td>
</tr>
<tr>
<td>Experience (existing cases, success stories)</td>
<td></td>
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<tr>
<td>Availability of skillful professionals</td>
<td></td>
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<tr>
<td>Necessity (being basic materials)</td>
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</table>
Considerations When Choosing Building Materials
Attributes People Value When Selecting Structural Materials

If to Choose Wood as A Building Material
Affordability and availability of materials are top valued

- **Four ★ and above**
  - Affordability, cost, (5-6 ★)
  - Availability of materials (4 ★)

- **Three ★**
  - Aesthetics
  - Strength
  - Durability

- **Two ★**
  - Ease of use, easily moulded
  - Time taken to use materials
  - Quality

- **One ★ and lower**
  - Skill and capacity to use materials
  - Susceptibility to fire
  - Ecological sustainability
  - Water resistant
Attributes People Value When Selecting Structural Materials

If to Choose Timber as A Building Material
Overall, mixed reactions are identified towards using wood in construction

- Those in support of, considered wood to be **environmentally friendly** and **recyclable** in the event of demolition. A few mentioned its **carbon footprint** properties as an advantage for its use.

- Those opposed to it reported concerns around **inadequate forest resources** - hence lack of availability, interference with government restrictions imposed on forest harvests as well as impact on the environment such as **environmental degradation, deforestation and global warming**.

- **Locality** of timber was also a concern. People showed **preference for locally sourced timber** due to transportation cost, which make it a costly construction material.
Timber is mostly perceived as supporting rather than structural materials, but it's lightweight is appreciated

- Wood is not perceived as a strong structural material for lack of properties that traditional materials such as concrete poses.
- Timber is mainly used for its aesthetic value as a finishing material and not mainly a structural component.
- Some people perceive timber to be more expensive when compared to other building materials, especially in Kenya where local supply is relatively limited.
- Ease of use (mostly due to lightweight) and easy to be moulded is appreciated.

“I think it is more of tradition where clients don’t look at wood as a structural material. Say, you are putting up a 20 storey building and you tell the client that you will use timber for the columns and beams, they would laugh at you. People here haven’t seen that side of timber.”
- Male, Kenya, 32 yrs

“I would consider using wood when doing finishes because it looks good on the floor, walls and ceilings.”
- Male, Kenya, 26 yrs
Although timber is highly preferred for its aesthetics, there are concerns on its resistance and sustainability

- Maintenance of wood is considered not sustainable, making wood unsuitable for long-term projects.
- Wood properties such as susceptibility to fire and water make it less desirable as a structural material but is much more preferred for its aesthetics.
- Pro environmentalists are opposed to the use of timber due to the ecological sustainability aspects and effects on the environment.

“At the moment climate change is becoming a big deal in the world, the source of timber is our trees and they play a critical role in mitigating global warming.”
- Male, Kenya, 26 yrs

“You have to treat it for it to last long for a permanent project. Therefore, it will end up being expensive in the long run.”
- Female, Uganda, 35 yrs
Support from government is asked for massive adoption, but not necessarily for high skills by a few developers

- There is lack of government buy-in to trade, and government bans further limit the availability of timber.
- Sustainability of wood production seems impossible due to inadequate supply and forest cover.
- A handful of developers regard wood as something that doesn’t require advanced skills for building.

“You will find that most governments across the globe limit or completely burn exploitation of particular kinds of woods or trees. The most preferred is hard wood because of its durability.”

- Male, Uganda, 34 yrs

“An issue here probably is I do not know if we have enough quantity of forest for mass production of timber.”

- Male, Kenya, 29 yrs
Early Adopters of Mass Timber

The low-hanging fruit
**Type of People**

Prioritize to get buy-in from architects and engineers, cost-sensitive key players, and low-cost housing planners.

Start promoting among middle-aged, middle class, younger generation, and men, who are more likely to welcome the new housing fashion among end consumers.

**Type of Buildings**

Start with residential buildings, especially for low-rise apartments or stand-alone houses, which are more imaginable among current key stakeholders.

Co-design with Receptive Planners for office buildings and lodgings that are more locally adaptive.
Early Adopters of Mass Timber
Types of Building

Types of People
It is easier to start with residential buildings, especially stand-alone or low-rise housing

Some people believe that mass timber can be adopted to all kinds of buildings with no limitation, while most others tend to believe it is more suitable for residential buildings, especially for low-rise apartments or stand-alone houses.

“To get into the country I think the easiest way would be through the residential buildings. If done commercially it has to be a reputable company or the government.”

- Male, Kenya, 29 yrs

“Residential buildings are more receptive to these types of changes. With commercial buildings, it will take a longer time to embrace it - it involves different decision makers of different opinions, so they would prefer materials that have been tested and you know will not damage easily.

- Male, Kenya, 32 yrs

To introduce mass timber to the local market as a new material and concept, better start with the residential buildings, or low-rise and mid-rise office buildings and lodgings (especially in game parks).
Middle-aged, middle class, younger generation, and men are more likely to welcome the new housing fashion

- **End consumers:**
  - Middle-aged, in their 40s or 50s, who are stabilising and constructing their own homes. They are more open to new technologies used in building, compared with the older groups.
  - Younger generation, who are most receptive to new concepts
  - Middle class, who are capable and willing to try new things
  - Men

  “Men are risk takers while women will only do something that they trust in.”
  - Male, Kenya, 29 years
Prioritize to get buy-in from architects and engineers, profit-driven key players, and low-cost housing planners

- Architects and engineers
  - who have the authority to approve what to be used by private developers

- Traders and businesses:
  - who are more profit-driven and less risk averse, and play part in the construction value chain

- Governments
  - who are planning for low-cost housing projects