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Cape Town, South Africa, 4 – 6 June 2024.

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DECLARATION

Thirteen submissions were received and accepted for presentation at the Symposium from authors based in 16 Universities and 1 College of Technology, located in Nigeria, Uganda, United Kingdom, and South Africa. All full papers in this publication went through a double-blind peer-review process which involves submission of full papers, review of full papers by the Scientific Review Committee, feedback to authors on full papers submitted which included a decision on acceptance and evaluation of the revised papers by the Scientific Review Committee to ensure the quality of the content.

Instituitional Affiliation	**Count of Affiliation**	**Affiliation%**
Cranefield College of Project and Programme Management, South Africa	1	3%
Durban University of Technology, South Africa	3	9%
Federal University of Technology, Akure, Nigeria	1	3%
Global Institute of Property Studies, Uganda	1	3%
Joseph Ayo Babalola University, Ikeji, Nigeria	2	6%
Obafemi Awolowo University, Nigeria	2	6%
Stellenbosch University, South Africa	3	9%
University of Cape Town, South Africa	5	15%
University of Cross River State, Calabar, Nigeria	1	3%
University of East London, United Kingdom	1	3%
University of Ibadan, Nigeria	5	15%
University of Stellenbosch, South Africa	1	3%
University of the Witwatersrand, South Africa	5	15%
Yaba College of Technology, Lagos, Nigeria	1	3%
Cambridge University	1	3%
Central University of Technology, Free State	1	3%
Total	**34**	**100%**

PREFACE

On behalf of the organizing committee of the Innovative Solutions for Affordable Housing (ISAH) 2024 Symposium, I extend a heartfelt welcome to everyone joining us, whether in person or remotely, over these three days. We are thrilled to see both familiar faces from past events and new participants who are attending this symposium for the first time. This year's symposium is dedicated to exploring groundbreaking solutions and sustainable practices in affordable housing.

We are honoured to host this significant gathering at the UCT Graduate School of Business in Cape Town, South Africa, where practitioners, policymakers, researchers, and community stakeholders come together to push the boundaries of what is possible in affordable housing. Our gratitude extends to the Scientific Review Committee and Local Organizing Committee whose tireless efforts have ensured the high quality and impactful nature of this event. Your relentless dedication to rigorous peer-review processes and seamless organization has been foundational to the symposium's success.

Our keynote speakers this year, including distinguished personalities like Prof. Francesco Pomponi, Mr. Craig Makapela, Prof. Ayodeji Aiyetan, Ms. Xoliswa Daku, Mr. Barry Lewis, Mr. Pragasan Chetty, Prof. Johannes John-Langba, Prof. Stephen Ogunlana, and Mr. Robert Plattner promise to deliver thought-provoking insights that are sure to stimulate discussions and inspire innovations. We are also excited about the various workshops and parallel sessions spread across the programme, focusing on critical areas such as Alternative Building Technologies (ABTs), public-private partnerships, sustainability, and community engagement.

We are proud to announce that thirteen submissions were accepted for presentation at the symposium, hailing from thirteen universities and one college of technology. These submissions have undergone a rigorous double-blind peer-review process, contributing significantly to the body of knowledge that will benefit policymakers, practitioners, and the academic community.

Reflecting on the previous editions of our workshops, we see a steady growth in both participation and the depth of shared knowledge. This year's edition builds upon past successes, marked by insightful presentations, robust panel discussions, and engaging workshops. Notably, the unveiling of a prototype re-imagined informal house using ABTs will highlight the practical applications of our collective efforts in affordable housing.

As we embark on this journey of knowledge exchange, I urge all participants to actively engage in intellectual debates, learn from each other, and foster collaborations that will extend beyond the symposium. Your presence and contributions are vital to the success of this event and the ongoing quest for innovative sustainable housing solutions.

I warmly welcome you all to the ISAH Symposium 2024.Should you have any queries or require assistance, please feel free to reach out to me or the organizers.
Thank you very much for your attention.

June 4th, 2024

Professor Abimbola Windapo
Chair, Innovative Solutions for Affordable Housing (ISAH) 2024 Symposium

SCIENTIFIC REVIEW COMMITTEE

Prof. Abimbola Windapo	University of Cape Town, South Africa
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Prof. Francesco Pomponi	University of Cambridge, United Kingdom
Dr. Lindelani Matshidze	University of Witwatersrand, South Africa
Dr Salie Mahoi Fourah	Bay College, Sierra Leone
Dr. Kehinde Alade	University of Cape Town, South Africa

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Fabio Companie	University of Cape Town, South Africa
Sizolwenkosi Mthethwa	University of Cape Town, South Africa
Darmarajan Chinasamy	Secretary, University of Cape Town, South Africa

THE PEER REVIEW PROCESS

All the full papers in this publication went through a rigorous two-stage blind peer review process by no less than two acknowledged experts in the subject area to ensure that high-quality scientific papers were produced and included in the proceedings.

The submitted full papers were first of all checked to ensure papers are aligned to the symposium themes, then for originality and inappropriate copying using the Ithenticate software. After that, the papers were assigned to experts in the field based on their areas of expertise for review. The full papers were reviewed in terms of relevance to the originality of the material; technical writing; academic rigour; contribution to knowledge; pertinent literature review; research methodology and robustness of analysis of data; empirical research findings; and overall quality and suitability of the paper for inclusion in the proceedings.

Evidence was required relative to specific actions taken by the authors regarding the reviewers' comments. Final papers were only accepted and included in the proceedings after satisfactory evidence was provided that the paper had met all the conditions for publication. Thirteen papers were finally accepted and included in the ISAH-Symposium proceedings.

At no stage was any member of the Scientific Committee, Review Panel or the Organising Committee, or the Editors of the proceedings involved in the review process related to their own authored or co-authored papers. The role of the editors and the scientific committee was to ensure that the final papers incorporated the reviewers' comments and to arrange the papers into the final sequence as captured on the USB memory stick and Table of Contents.

Professor Abimbola Olukemi Windapo
Chair, Scientific Committee ISAH 2024 Symposium

COMMUNIQUÉ OF THE INNOVATIVE SOLUTIONS FOR AFFORDABLE HOUSING SYMPOSIUM

04-06 June 2024

Overview:

The Innovative Solutions for Affordable Housing Symposium, held over three days, brought together more than 100 key stakeholders from government, academia, the private sector and civil society to address the significant challenges facing affordable housing development. The discussions revolved around issues in informal settlements, innovative building technologies, community empowerment, and sustainability in housing development and construction practices.

Day 1 Summary:

The first day featured workshops and academic presentations exploring the construction strategies used by informal builders and the challenges of housing construction in informal communities. The challenges identified include financial constraints, lack of materials, and the need to recognize community-driven solutions. The presentations examined community engagement, alternative construction methods, and the importance of localized solutions, emphasizing training and awareness for informal builders on innovative construction methods and materials. The workshops focussed on engaging participants in discussions around practical solutions for addressing overcrowding, safety and community cohesion. The workshop also focussed on hands-on construction techniques using the Sandbag and Eco-beam eco-friendly building materials, highlighting the interplay between technical training and community participation.

Day 2 Highlights:

The second day included keynote presentations and panel discussions on the high costs of building materials, the role of public-private partnerships, and the integration of academia and industry to engender collaboration towards sustainable housing development. The keynote presentations highlighted the innovative use of local building materials and technologies while advocating for community-driven housing

initiatives, emphasizing women's empowerment in construction and the need for inclusive planning processes.

Day 3 Summary:

The final day further explored the intersection of academia and industry in affordable housing, innovative building material solutions, and scholarly presentations outlining sustainable construction strategies, process management, and construction technologies applicable to housing. The focus was on bridging knowledge gaps that prioritize community involvement and regulatory reform.

Conclusion:

Based on the presentations, panel discussions, and workshops, it can be concluded that sustainable and inclusive solutions that address housing needs can be implemented through collaboration between the government, communities, regulators, building material suppliers, and NGOs. The success of these initiatives will rely on funding and embracing local community-based construction practices.

Recommendations:

The following are the recommendations for stakeholders based on the findings:

1. **For Government:**
    - Implement policies that support community-led housing initiatives.
    - Allocate resources for training workshops that educate informal builders on innovative and sustainable construction techniques.
    - Enhance support for Public-Private Partnerships (PPPs) aimed at affordable housing developments, ensuring transparency and community engagement.
2. **For Regulators:**
    - Reform regulations to facilitate the adoption of alternative building materials and methods
    - Streamline approval processes for innovative building technologies to encourage their adoption.

3. **For Building Material Manufacturers:**
    - Invest in research and development of cost-effective, sustainable materials accessible to low-income communities.
    - Create partnerships with local communities to educate them about alternative materials and construction techniques.
4. **For Communities:**
    - Develop grassroots initiatives to address housing challenges, utilizing local resources and knowledge.
    - Organize community workshops to empower residents through education on sustainable construction practices and self-help initiatives.
5. For Non-Governmental Organisations (NGOs):
    - Advocate for policies prioritising affordable housing and engaging in community capacity-building efforts.
    - Facilitate dialogue between communities and government to address housing needs while promoting sustainability.

We look forward to your feedback and thank you for your participation and commitment to advancing solutions to enhance affordable housing!

ENDORSEMENTS

The Innovative Solutions for Affordable Housing Symposium is funded by the Royal Academy of Engineering and supported by the National Home Builders Registration Council, Development Action Group, National Research Foundation, UBU and the Journal of Construction Business and Management.

https://journals.uct.ac.za/index.php/jcbm/login

KEYNOTE SPEAKERS

The ISAH 2024 Organising Committee would like to thank our keynote speakers for accepting the invitation to come and share their presence and thoughts on innovative solutions to affordable housing debacle with housing stakeholders, end-users and the academic and professional community.

PROFESSOR FRANCESCO POMPONI

Francesco Pomponi is the Senior Associate at the Institute for Sustainability Leadership at the University of Cambridge, an Honorary Professor at the University of Cape Town, and Visiting Professor at Edinburgh Napier University, where he previously held the Chair of Sustainability Science and led the Resource Efficient Built Environment Lab (REBEL). His academic expertise lies in life cycle assessment, embodied and whole life carbon, and the circular economy. Within the built environment his work revolves around low-carbon buildings, measurement, management and mitigation of environmental impacts, and passive design. He has published more than 120 peer-reviewed outputs and advised national governments and international bodies around sustainability in the built environment. He holds a PhD in Life Cycle Assessment, and MSc in Engineering Management and a BEng in Industrial Engineering. Professor Pomponi is also a Fellow of the Royal Society of Arts and of the Higher Education Academy. Currently his career being at the interface of academia, entrepreneurship and innovation, and non-profit organisations to create the trusted tools and data for the transition to a Net Zero built environment.

MR CRAIG MAKAPELA

Craig Makapela, the Executive Manager of Engineering and Technical Services at the National Home Builders Registration Council (NHBRC), has been employed in the construction industry since 2001. He holds a BSc. Eng (Civil) degree from the University of Cape Town (UCT). Mr. Makapela's academic accolades are also from the University of Pretoria in B. Eng (Hons) (Geotechnical Engineering) and M. Eng (Engineering Management), respectively. Makapela's contribution to the human settlements value chain through organisations such as Mariswe (formerly known as UWP Consulting), Transnet, as well as the NHBRC has seen him playing an advisory role to municipalities and provincial departments through risk analysis in the home building industry, advising, and providing guidance on the structural warranty to new homes and residential housing designs as well as approval of construction sites and the assessment of geotechnical reports. As a registered engineering professional, Makapela's memberships include the South African Institution of Civil Engineering (SAICE), Engineering Council of South Africa (ECSA), and the South African Council for the Project and Construction Management Professional (SACPCMP).

PROFESSOR AYODEIJI OLATUNJI AIYETAN

Professor Ayodeji Olatunji Aiyetan is a Senior Lecturer and Head of Department of Construction Management and Quantity Surveying at the Durban University of Technology, Durban. D Aiyetan holds the following qualifications: B.Sc. Building (1986), M.Sc. Construction Management (both at A.B.U Zaria, Nigeria) and Ph.D. Construction Management 2011 (NMU, PE, South Africa). Dr Aiyetan has published DHET accredited Journal and Conference papers at both National and Internationally.

MR BARRY LEWIS

Barry Lewis, an architect and the founder of Ubuhle Bakha Ubuhle (UBU), collaborated with The Warehouse NGO in Wetton, Cape Town. A program was implemented in the informal community of Sweet Home Farm in Philippi.

During the initial three years, the primary objective was to establish relationships rather than construct homes. Barry and Siya James, who would later serve as the community's leader and factory manager at UBU, established and operated a soccer club known as "The Superstars of Sweet Home Farm."

UBU was established in 2012, and although it was legally recognized as a business, its primary objective was to establish a facilitated building methodology and to assist the UISP (Upgrade of Informal Settlements Program) project in the community, which is administered by the City of Cape Town.

MS XOLISWA DAKU

Successful business leadership, legal passion and corporate governance specialist - these are some of the attributes that one can use to describe the property mogul that is Xoliswa Daku. She is the Founder and CEO of DAKU (PTY) Ltd, a 20-year-old privately held entity with subsidiaries in property, law and energy.

Daku Properties focuses on property development, facilities, and asset management. Her property development vision is to develop corridors of excellence, turn small towns into economic hubs, and redevelop underutilized properties. Whilst Daku Legal focusses on mergers and acquisitions and Daku Energy specializes on investment in energy efficiency and development.

She is an astute lawyer with 26 years of experience, Chair of SEDA and Deputy Chair of the University of the Western Cape, holding LLM, EMBA, and various international post grad business diploma in her bag. Daku has served on various boards for the past 26 years specializing on governance, institutional framework, FDI, trade and industry. Her company footprint is nationwide and carries an international flavour. She has worked with multinationals globally, seeking opportunities for the growth of the country. Her generosity and community development approach describes where she comes from.

MR PRAGASAN CHETTY

Pragasan Chetty is the CEO of Modular Innovative Building technologies (MIBT). MIBT are manufactures of structurally insulated lightweight concrete panels (SIP Technology).

Modular Innovative Panel (Mi Panel) is one of the highest certified Agrément systems in Africa. Agrément is the international certification authority for alternative building systems and is administered by the CSIR in SA, under the auspices of the DPW. Mi Panel is approved by all major banks for EDGE end user bonds as well as development funding. Mi Panel is a load bearing and structural walling system that exceeds the physical strength of a 9-inch clay brick wall Ito vertical compression as well as shear capacity - we can hang 740 kgs of load off Mi Panel walls.

Mi Panel has a higher R value Ito of thermal insulation properties than a 9-inch clay brick wall. Mi Panel is a rapid construction system with zero water consumption on site and is both EDGE (IMF AND IFC certification) and LEED -US Green Building Council approved technology.

SIP technology is the most prevalent building technology in the world now in terms of increased usage and is only going to be more dominant in the future. Mi Panel walling system is easy enough to use that the system can be taught to most people who have never worked on a construction site, necessitating the need to employ local labour with a SAQA accreditation for training and development.

PROFESSOR JOHANNES JOHN-LANGBA

Johannes John-Langba, Ph.D., MPH is Professor of Social Work in the School of Applied Human Sciences and Director of the College of Humanities Doctoral Academy at the University of KwaZulu-Natal (UKZN) in South Africa. Prof John-Langba holds PhD (Social Work) and Master of Public Health (Behavioural and Community Health) degrees from the University of Pittsburgh (United States) and a Master of Social Work (MSW) from Howard University (United States).

Prof John-Langba is the recipient of a number of scholarly awards including the Dr Inabel Burns Lindsay Social Work Education Leadership Award from Howard University (United States), for outstanding leadership in social work education and the promotion of social justice in Africa and an Excellence in Teaching Merit Award from the University of Cape Town (South Africa).

He is the current Regional Vice President-Africa of the World Federation for Mental Health (WFMH) and also serves as Vice President and Mental Health Ambassador of Cape Mental Health (CMH) in South Africa. Prof John-Langba serves as co-chair of the Data Ethics Working Group of the International Science Council's Commission on Data (CODATA) and is a member of the KwaZulu-Natal Provincial Substance Abuse Forum in South Africa.

PROFESSOR STEPHEN OGUNLANA

Professor Ogunlana graduated with an honour's degree in Building from University of Ife, Nigeria in 1981. He also obtained a master's degree in construction management from the same university in 1984.

He was a partner in TOS Associates, a firm of project management consultants and a staff of the Department of Building, University of Ife, between 1982 and 1986. He obtained a PhD in Construction Management at Loughborough University in the UK. He joined the Asian Institute of Technology (AIT) as assistant professor in 1990 and was promoted to associate professor and full professor in the same institute.

Professor Ogunlana, a renowned researcher in system dynamics simulation, has a strong international reputation for his work in construction projects and organizations. He has been the Chairperson for the academic senate in AIT from 2005 to 2007 and later Chair of Construction Project Management at Heriot-Watt University. He is currently the director of Elim Project Systems Limited and has authored over 250 scholarly publications. His research has been funded by various organizations, including the Canadian International Development Agency, European Union, Thai National Housing Authority, UNOCAL, Japanese Government, and British Council. Ogunlana is also the joint coordinator of the CIB W107 Commission on Construction in Developing Economies and a member of the Editorial Board for over 10 internationally refereed academic journals.

MR ROBERT PLATTNER

Robert Plattner, co-founder of the Hydraform group in 1988, has over 38 years of technical expertise in building technology. The group is based in Johannesburg. He is the creator of the Hydraform building technology, which has been implemented in more than 70 countries worldwide. In 2012, Robert was appointed as the company's managing director.

Hydraform is a South African company renowned for its innovative building technology utilizing hydraulic block-making machines. Hydraform has become a global leader in the manufacture and distribution of construction machinery for building affordable, eco-friendly housing solutions.

The Hydraform blocks eliminate the need for traditional mortar during construction, allowing for faster and more cost-effective building processes. Hydraform's technology is particularly well-suited for low-cost housing projects, rural development initiatives, and sustainable construction practices. Hydraform's mission is to provide innovative solutions for sustainable building practices, addressing the challenges of affordable housing, infrastructure development, and environmental sustainability. Through partnerships with governments, non-profit organizations, and private enterprises, Hydraform has contributed to the construction of thousands of homes, schools, clinics, and community facilities in over 70 countries worldwide.

With a commitment to quality, efficiency, and social impact, Hydraform continues to pioneer the usage of locally available earth as a construction raw material and transforming the earth into interlocking dry stacking high quality building blocks which are produced on the building site. This advancement in ancient construction linked up with the Hydraform technology is empowering communities to build better futures through accessible and sustainable housing solutions.

ISAH 2024 WORKSHOP

PRESENTERS

Darmarajan Chinasamy

UCT Master Student researching the supply chain issues of sustainable building technologies designed for low carbon and affordable housing in South Africa.

Dr Kehinde Alade

Expert in sustainable construction, project management, and construction disciplines. Collaborates with diverse teams in UK and Africa, managing risks, budgets, and quality. Committed to solving global challenges through research, teaching, and professional practice.

DAY 1 04 June 2024: WORKSHOP SYNOPSIS

The workshop section of the Symposium explored the construction strategies employed by informal builders, challenges faced to housing construction in informal communities, and the importance of community engagement, awareness and training on the use of alternative construction techniques in housing construction. The session consisted of both academic presentations and a hands-on workshop that involved building a prototype structure using sandbags and eco-beams. The audience engaged in activities including discussions, quizzes, Question and Answer sessions and learned from each other.

The session began with introductions by Prof. Abimbola Windapo followed by a presentation by Darmarajan Chinasamy titled Construction strategies, techniques and specifications used by dwellers of informal settlements. Darmarajan showcased case studies centered around three informal settlements in South Africa, specifically, Franschhoek, Ocean View, and Khayelitsha. He proceeded to emphasize the historical context, construction methodologies, and various types of housing built within these informal communities. He summarized the construction techniques used by informal builders, the observed specifications for internal configuration, and the essential amenities needed by the residents. He suggested several methods to enhance the construction strategies of informal builders. These include offering comprehensive training to builders, establishing standardized practices in the shack

construction market, and raising awareness among clients to improve the quality of shacks. Ultimately, he proposed several theories that are underestimated in informal communities. These include the notion that informal settlers have the financial capacity to enhance their buying power, the advantage of utilizing ABT to offer alternative housing choices and encouraging the construction of permanent structures through the promotion of security of tenure.

The second presentation by Dr Kehinde Alade titled Limitations and challenges to housing construction in informal communities focussed on identifying the various challenges in informal settlements, from resource access to technical building issues, and advocating for community-driven, sustainable solutions. The presentation opened with a reminder of the importance of community engagement and grassroots discussions in solving housing issues in informal settlements. Dr. Alade emphasized the vast number of people living in informal settlements worldwide, particularly in Sub-Saharan Africa, underlining the critical need for sustainable solutions. He highlighted that about one in five South Africans live in informal settlements, reflecting a significant housing challenge that aligns with sustainable development goals (SDGs) aiming for inclusive, safe, resilient, and sustainable human settlements. He described informal settlements as urban areas developing without formal state control, characterized by a lack of adequate living conditions, health, and nutrition, and noted that despite the deprivation, these settlements are places of creativity where people find innovative ways to handle their living conditions. By engaging with informal settlement builders and community leaders he identified the challenges and limitations to housing construction in informal communities as access to resources – financial constraints and access to construction materials; lack of formal training of informal builders in management skills, safety standards and technical know-how; and technical challenges – the structural durability and resistance of the homes to the weather are often compromised due to poor construction techniques and materials. The context set by these presentations by Darmarajan Chinasamy and Dr. Kehinde Alade highlighted the complexity of informal settlements and the necessity for innovative solutions that match their unique socio-economic and geographic challenges.

Following the presentations, the Workshop Session facilitated by Dr. Amanda Filtane, Dr. Salie Mahoi and Barry Lewis, focuses on understanding and resolving the complexities surrounding informal settlements, particularly the issues of housing, community dynamics, and sustainable building practices. The discussion is framed around community engagement and the practical use of alternative construction techniques. The panellists invited audience members to contribute further ideas and questions emphasizing the workshop's goal to generate actionable solutions rather than merely discussing theoretical frameworks to practical, actionable solutions for making informal settlements more liveable. The intent is to recognize the existing informal structures' resilience and creativity and to bolster these with informed technical and material support. The key problems identified included the necessity of secure tenure, community-based design solutions, and how community self-help initiatives can be effective. A significant point was how political and economic challenges affect housing. Others include:

1. **Displacement and Community Connections**: Residents often refuse housing relocation due to loss of community ties and increased distance to essential services like schools and clinics.
2. **Overcrowding and Limited Space**: Families living in informal settlements often find the government-issued houses inadequate due to space constraints, prompting a need for extensions.
3. **Temporary Nature and Perpetuity of Informal Settlements**: The misunderstanding that informal settlements are temporary, whereas many residents have lived in such conditions for decades.
4. **Safety, Noise, and Infrastructure Issues**: Concerns include crime, noise disturbances due to proximity, and structural issues like leaking roofs and unstable doors.
5. **Economic Activity Spaces**: The need for integrated working spaces within homes for informal economic activities.

The informal builders and end-users were aware of the drawback of the materials used for informal housing construction – Zinc, which is used for the roof and walls however, due to its temperature conduction, it makes homes very hot. They also noted that they have limited understanding of alternative materials. The following alternative materials were proposed – sandbags (good for temperature regulation but requires proper

cladding); Bamboo (grows rapidly, structurally sound, but climate-dependent); Thatch and Mud (traditionally used but might need modernization for durability); Steel Structures (quick to build but energy-intensive and costly). It was concluded that emphasis should be on using locally available materials tailored to the environment and economic situation of the end-users. Other solutions proffered are as follows:

1. **Design Solutions**: Community members voiced the need for secure, soundproof, expandable homes that consider safety and proximity to services.
    - Use of soundproofing materials in Zinc housing construction.
    - Develop modular designs that can be expanded horizontally or vertically.
    - Integrate economic spaces within housing plans.
2. **Community and Leadership Dynamics**:
    - Regular rotation and accountability in community leadership to prevent corruption and ensure the welfare of the community.
    - Establishing rules around noise and safety tailored to the community's context.
3. **Material Education and Training**: The experts provided detailed explanations on the properties and viability of various building materials and proposals for integrating modern building technologies with traditional practices:
    - Training residents on using alternative building technologies effectively.
    - Community-based initiatives to recycle and reuse materials innovatively.
4. Long-term Planning and Inclusivity:
    - Efforts to secure land tenure and legalize informal settlements to provide a stable foundation for improvements.
    - Collaborative planning involving residents, technical experts, and policymakers to ensure sustainable and accepted solutions.

Charles a community leader's immediate offer to visit and assist with a leaking roof of a community member demonstrates the practical and immediate support required in such communities. The session effectively transitioned from identifying issues to formulating practical steps, with a strong emphasis on collaborative efforts among community members, technical experts, and governmental support.

The practical session demonstrated by Barry Lewis the CEO of UBU on building with sandbags and eco-beams. This was designed to showcase a hands-on approach

where participants could learn the construction technique by engaging directly with the materials. Main components of the sandbag construction included eco-beams made from galvanized steel and timber, sandbags made from recycled plastic, and techniques to ensure the structural integrity of the walls. Discussion on materials stressed the importance of using locally available resources to keep costs low and sustainability high. Participants learned the differences between various types of sand and underlined the importance of moisture content in the sand to ensure compactness and durability. Numerous questions from both in-person and online participants were addressed. Topics included the structural integrity of sandbag walls, flood resistance, the challenges of building in various geographic locations, and how to engage communities in construction projects. The importance of educating local builders and involving community members in the entire construction process was highlighted.

The workshop was highly interactive and aligned community needs with technical expertise to advance the dialogue on sustainable housing solutions. The use of sandbags in construction was established as a viable, cost-effective, and sustainable method that could address some of the most challenging aspects of housing in informal settlements such as structural durability, fire, floods, crime and heat.

KEYNOTE ADDRESS

Quantifying Sustainability: What matters where?

Professor Francesco Pomponi

Prof. Francesco Pomponi, the first presenter, delivered a thought-provoking talk on the true meaning of sustainability, exploring the fundamental principle of meeting present needs without compromising the ability of future generations to meet theirs, emphasizing the need to understand local contexts and needs rather than adopting broad, universal solutions. He critiqued the inefficacy of current language and terminologies used in discussions of informal housing and proposed a more human-centric approach. His presentation explored various aspects of housing adequacy, showing how terms and standards often differ vastly between regions, thus needing unique, context-specific solutions. The presentation highlighted the socio-economic and cultural contrasts between the Global North and the Global South, particularly in the realm of housing. Prof. Pomponi pointed out the pitfalls of conventional terminology such as "informal settlements" and "refugee camps," advocating for a shift towards more inclusive and dignified language. Prof. Pomponi also pointed out the significant disconnect between policymakers' strategies and the actual needs of communities, advocating for a more participatory approach where communities are actively involved in designing and implementing housing solutions. Prof. Pomponi's talk aimed to inspire a rethinking of sustainable development practices, underscoring the richness of local solutions in achieving broader sustainability objectives.

The session also saw interactive discussions with the audience, who raised pertinent questions about the viability and effectiveness of social housing, the role of regulatory bodies, and the need for community empowerment in housing projects. Prof. Pomponi responded by highlighting the importance of ownership, community-driven initiatives, and learning through failure as critical components in achieving sustainable housing solutions

Public-Private Partnerships in Housing Development: Leveraging Resources for Mass Housing Projects.

Ms Xoliswa Daku

Xoliswa Daku's presentation focused on the challenges and opportunities in Public-Private Partnerships (PPPs) for community-driven development projects in South Africa. She highlighted her experience working on projects that involve complex land and community dynamics. Xoliswa introduced PPPs as collaborations between the public sector and private entities aimed at developing public assets or services. She highlighted that these partnerships are rooted in South Africa's Public Finance Management Act (PFMA) and Municipal Finance Management Act (MFMA). Ms. Daku provided Case Studies and Project Examples to support her presentation. Xoliswa discussed a development project involving 43 hectares of land in the Eastern Cape. The project faced issues such as land claims and community resistance. Despite plans for varied housing types including RDP (Reconstruction and Development Program) units, community demands altered the initial plans to focus solely on RDP housing. Another example involved a long-term lease with Prasa (Passenger Rail Agency of South Africa) to create mixed residential apartments. The goal was to provide affordable housing near transport hubs, thus integrating them into the broader public transport system. She highlighted plans for a ten-storey building that would house 1,000 apartments aimed at creating an inclusive community living closer to their workplaces in the Woodstock Development. This project emphasizes high-density living and the use of innovative building technologies.

Ms. Daku discussed the various challenges faced in land development to include Planning and Land Audit - Issues with land audits and title deeds often reveal unanticipated complexities such as additional land claims and outdated land use records. These factors can significantly delay project timelines. Also, Community Resistance – Community demands sometimes diverge from original plans, requiring negotiations and amendments to ensure the project's success while satisfying community expectations. Xoliswa emphasized the need for durable and cost-effective building technologies to manage infrastructure costs. These technologies should also be adapted to high-density developments like those planned in the Woodstock development. She also highlighted the importance of viewing housing developments

not just as construction projects but as opportunities to enhance the socio-economic status of communities. This involves creating inclusive environments that contribute positively to residents' health, education, and employment. A significant portion of the discussion revolved around women's empowerment in the construction industry. Xoliswa stressed the necessity of including women at all levels of these projects, from labour to leadership roles, and ensuring they benefit from the opportunities created.

Several questions addressed the themes of women empowerment, the inclusion of rural women in these projects, and the need for more accessible information and support structures for aspiring female developers. The sustainability and affordability of housing for all community segments, including the unemployed, were also discussed. The key takeaways from her presentation included: Inclusive Planning – emphasis on community involvement and flexible planning to meet local needs; Women Empowerment with focus on creating opportunities and support systems for women in the construction industry; leveraging innovative and cost-effective building technologies to enhance project feasibility and sustainability; and Holistic Development - ensuring that housing projects contribute to the broader social and economic well-being of communities.

Potential of Innovative Building Technologies (IBTs) in addressing the housing backlog and improving construction standards in South Africa.

Mr Craig Makapela

Craig Makapela, representing the NHBRC (National Home Builders Registration Council), provided a comprehensive overview of the potential of innovative building technologies (IBTs) in addressing the housing backlog and improving construction standards in South Africa. The presentation covered several key points, including the benefits, challenges, and necessary policy support for IBTs.

Makapela began by highlighting the significant housing backlog estimated at 2.4 million units, exacerbated by rapid urbanization and the limitations of traditional brick-and-mortar construction methods. He noted the inability of current methods to meet the demand, thus necessitating the adoption of more efficient IBTs. He explained that IBTs, which include advanced materials such as nanotechnology, lightweight steel panels, and concrete innovations, can accelerate construction processes, reduce costs, and improve energy efficiency and thermal performance of homes. These technologies also offer durability and fire resistance, critical for informal settlements prone to fires. Furthermore, Makapela discussed the value of adaptive technologies like additive manufacturing, which can print construction elements on-site, thereby saving time and labour. He emphasized the importance of aligning these technologies with local conditions and educating communities about their benefits.

Challenges addressed included the initial higher costs of IBTs compared to traditional methods, the need for skilled labour to handle new technologies, and resistance to change due to familiarity with conventional building techniques. He urged for greater government support, including policy adjustments, financial incentives, and the continuation of the NHBRC's role in educating housing consumers and ensuring quality assurance. Makapela concluded by urging the incorporation of IBTs in human settlement plans and the development of guidelines to assist municipalities and provincial departments in adopting these technologies, ensuring sustainable, affordable, and safe housing solutions across South Africa.

The High Cost of Building Materials and Promoting Innovation in the Construction Industry.

Professor Ayodeji Aiyetan

Prof. Ayodeji Aiyetan's presentation focused on the significant issue of rising building material costs in the construction industry and explored innovative solutions to mitigate these costs and improve project feasibility. Prof. Aiyetan noted that Building material costs constitute a significant portion of project expenses, often cited as 70-30 or 60-40 ratios compared to labour costs, and that high material costs complicate project completion within budget, leading to financial difficulties for developers and contractors. He identified 29 factors affecting the high cost of building materials, narrowing them down to nine major factors: Exchange rates of country currency; Government policies and regulations; Costs of raw materials; Inadequate infrastructural facilities; Scarcity of building raw materials; Costs of transportation and distribution; Interest rates and costs of finance; Costs of labour and plant; and Seasonal changes and political interferences. He noted that the adoption of new technologies and construction methods - robots and drones, 3D Printing can help mitigate high material costs. It was recommended that for the construction industry to remain sustainable and cost-effective, it must embrace new technologies, collaborative practices, and innovative materials, while encouraging knowledge sharing and collaboration among stakeholders such as consumers, government authorities, and complementary industries for industry growth and stability. Prof. Ayodeji Aiyetan emphasized the need for innovation and collaboration in the construction industry to address the high costs of building materials. He noted that the industry can improve project feasibility and deliver higher quality outputs within budget constraints by adopting new technologies, sustainable practices, and efficient project management methods.

Reviving Indigenous Architecture: Using Local Materials and Techniques for Affordable Housing.

Mr Barry Lewis

Barry Lewis's presentation emphasized the ethos of UBU ("Ubuhle Bakabantu Bakha Izinto Ezinhle" - Beautiful People Build Beautiful Things), emphasizing the empowerment of local communities to build their own homes, in using local materials, fostering inclusive building processes, incremental building and maintaining ongoing dialogue with communities. Barry rejected the notion of "reviving" indigenous architecture as it implies it was dead. Instead, he highlighted the ongoing presence and relevance of indigenous practices. He highlighted the practical application of these principles in current and future projects, particularly focusing on sandbag technologies for affordable housing. Barry showcased a project in rural Zimbabwe where communities used available materials like sand and empty feeding bags to build structures and highlighted the importance of using what is readily available to ensure sustainability and affordability and where everyone, including children and elders, participated. He stressed the importance of involving the community at every step to ensure successful and sustainable building practices. He emphasized that building together fosters community ownership and pride. He discussed the concept of incrementalism, where houses are built and improved over time as resources become available and highlighted that the of Sandbag Building Technology is cheaper, more flexible, and allows for continuous improvement and customization.

Barry introduced a current opportunity via a new tender by the City of Cape Town for building emergency housing using alternative building technologies and discussed how UBU plans to use sandbag technology to build these emergency houses incrementally, involving community members in the construction process. He focused on the pilot project in Sweet Home Farm, a site where UBU had previously worked. He mentioned the bureaucratic hurdles and the time taken for such projects to gain approval and start and highlighted health and safety considerations, particularly when building multi-story structures with sandbags. Barry emphasized the importance of training and continuous community involvement to ensure safety and durability. He addressed questions about scalability and safety of sandbag constructions for multi-

story buildings and acknowledged the limitations and emphasized that community safety and practicality are prioritized.

Maximizing Sustainability in Affordable Housing: Embracing innovative Building Technologies to Reduce Embodied Energy and Avoid Greenwashing

Mr Pragasan Chetty

Pragasan Chetty's presentation highlighted the critical need for innovation in the construction industry to meet the massive demand for affordable housing while ensuring sustainability. He explained that affordable housing touches on 14 of the 17 United Nations Millennium Development Goals and highlighted the massive demand for affordable housing due to high urbanization rates and insufficient supply. He explained that the average cost of a new build in South Africa is between R600,000 and R650,000 and that an affordable house must provide dignity, security, and allow families and communities to grow. He emphasized the role of modular construction in achieving these goals and warned against greenwashing where companies misrepresent their products or practices as more environmentally friendly than they are, emphasising that genuine sustainability requires transparency and proper implementation of green principles. He shared case studies of successful projects in various contexts such as building affordable houses in five days and modular housing structures in Zambia designed to be relocated with minimal wastage. Using various visual aids, including photos of innovative housing projects and construction sites, Pragasan illustrated successful implementations of modular construction. The presentation concluded with an interactive session where audience concerns about affordability and regulatory challenges especially the role of regulatory bodies in promoting alternative building technologies were addressed.

Education and Research: Bridging the Gap between Academia and Industry for Housing Development.

Professor Johannes John-Langba

Prof. Joannes John-Langba's presentation focused on the pivotal role of education and research in bridging the gap between academia and the construction industry for sustainable housing development. He underscored the necessity of effective collaboration between universities and industry players in order to achieve sustainable development goals (SDGs), particularly those related to housing. Prof. Langba emphasized that social scientists have a significant role to play in projects traditionally dominated by engineers and illustrated this by referencing his ongoing project on a shelter prototype for refugees, conducted in collaboration with engineers. Langba highlighted the well-documented "disconnect" between academia and industry, stressing that universities provide vital workforce training and innovative ideas while industries focus on practical application and profit. He noted that effective collaboration could enhance industry performance and help achieve SDG 11, which aims at making cities and human settlements inclusive, safe, resilient, and sustainable and which calls for ensuring access for all to adequate, safe, and affordable housing and basic services. On the definition of "adequate housing," he emphasized that what is deemed adequate varies and must involve community consultation for context-specific solutions.

Prof. Langba presented the Triple Helix Model as a potential solution for fostering innovation-friendly environments. The model advocates for close interactions among universities, industry, and government and aims to address the gap by facilitating regulatory compliance and reducing bureaucratic barriers. By working together, these entities can compensate for each other's shortcomings, thereby promoting evidence-based innovations that are crucial for sustainable housing developments. He acknowledged the challenges in academia-industry communication and collaboration, proposing that solutions lie in mutual understanding and transparent engagement. Prof. Langba also stressed the importance of revamping academic curricula to be relevant to industry needs, thus ensuring that students are well-prepared to join the workforce and contribute meaningfully. Addressing the issue of industry reluctance to

share data with researchers, Prof. Langba suggested that it is a matter of building trust and understanding the confidentiality concerns of industry partners.

Prof. Langba concluded that bridging the gap between academia and industry through collaborative frameworks like the Triple Helix Model is essential for achieving sustainable housing and urban development. He advocated for continued engagement, multidisciplinary approaches, and inclusive dialogue to meet the housing needs and challenges of the 21st century effectively.

Building Beyond Cement: Exploring Alternative Construction Materials and Technologies for Cost Effective Housing Solutions.

Professor Stephen Ogunlana

Professor Stephen Ogunlana, a construction management expert with strong international recognition, particularly in systems dynamic simulation in construction projects. His presentation focussed on building with and beyond cement using innovative construction technologies developed at the Asian Institute of Technology (AIT) in Bangkok, Thailand. His presentation focused on the innovative Habitech interlocking stabilized soil block technology, highlighting its cost effectiveness, sustainability, and community benefits. With successful implementations across various countries and applications, the technology presents a promising alternative to traditional cement-based construction, particularly suitable for low-cost housing in developing economies. He noted that the Research Centre was tasked with researching and developing low-cost, sustainable construction technologies, disseminating research through educational programs and demonstration projects. The Habitech Building System was noted to provide end-to-end solutions for constructing walls, door frames, and roof systems using locally available materials. Its main focus are the interlocking stabilized soil-cement blocks (SSBs) for building walls, with minimal cement usage (less than 10%). These blocks differ from conventional bricks; interlock without the need for mortar. It is produced using basic, manual or hydraulic press machinery and its advantages include the use of local soil, job creation, reduction in transportation costs and emissions, minimal use of cement, energy-efficiency, minimal wastes, and ease of construction with local labour. Despite the initial cost for equipment, the overall project costs is noted to reduce significantly (typically 30-50% savings). It is also noted to enhance living conditions and provide durable, long-lasting structures.

Prof. Ogunlana noted that the Habitech Building System can be used for residential buildings, schools, clinics, community centers, offices, resorts, and rapid response housing developments and that the system has been implemented successfully in several countries including Thailand, Myanmar, Nepal, Indonesia, and Nigeria. In

conclusion, Prof. Ogunlana notes that the Habitech system offers a viable, sustainable alternative to conventional building methods, particularly suited for developing economies and encouraged adoption and further projects in Africa, noting the minimal current penetration in Africa compared to other regions.

Building Beyond Cement: Exploring Alternative Construction Materials and Technologies for Cost Effective Housing Solutions.

Mr Robert Plattner

Mr. Robert Plattner, co-founder of the Hydraform Group, presented on the innovative building technology and its applications, particularly focusing on housing development and rural initiatives. Hydraform specializes in interlocking stabilised soil-cement blocks (SSBs), which are particularly suitable for low-cost housing and rural development. Hydraform blocks are made from soil stabilized with a small amount of cement. They are produced by pressing the soil-cement mix in Hydraform machines. The blocks interlock, eliminating the need for mortar between them. The blocks are produced on-site using local materials and are cured for 5-7 days before they can be used for building. The advantages of this technology according to Mr. Plattner is that it promotes local job creation because of its simplicity, reduces construction costs by up to 30%, and utilizes local resources. Mr. Plattner emphasized the importance of engaging the community in housing projects. Communities can take part in the construction process, making decisions on their housing needs and preferences.

Mr. Plattner noted that Hydraform blocks are suitable for building houses, schools, storage facilities, and even high-rise buildings and has a global footprint. Although Hydraform is based in Johannesburg, its technology is used worldwide, including in Africa, South America, and Asia. Surprisingly, it has not been widely adopted in the Western Cape of South Africa. He noted Housing projects in Tanzania and Mthatha, South Africa. The University project in Nigeria and an impressive hospital project in Abidjan, Ivory Coast. The Hydraform blocks align with the requirements of Green Technology because the blocks have a low carbon footprint compared to conventional building materials and provide excellent thermal properties, ensuring houses remain warm in winter and cool in summer. Mr. Plattner called for the promotion of local materials and community-driven projects to maximize the impact of affordable housing initiatives.

In conclusion, Mr. Robert Plattner's presentation highlighted the innovative Hydraform technology as a viable and sustainable solution for low-cost housing. Emphasizing the importance of community involvement and the use of local materials, he showcased the global success of Hydraform projects and called for greater adoption within South Africa to better serve local communities.

PANEL DISCUSSION

The ISAH 2024 Organising Committee would like to thank our Panel Discussants and Moderators for accepting the invitation to come and share their presence and thoughts on innovative solutions to affordable housing debacle with housing stakeholders, end-users and the academic and professional community

Panel Discussion I: Challenges and opportunities related to sustainable humana settlements and the adoption of Innovative Building technologies (IBTs), moderated by Fabio Companie

The first panel discussion on sustainability in the symposium was moderated by Fabio Companie and featured a diverse group of panellists, including Craig Makapela from the NHBRC, Dr. Amanda Filtane, Mr. Craig Makapela, Professor Babafemi, and Professor Francesco Pomponi. The discussion centered around the challenges and opportunities related to sustainable human settlements and the adoption of Innovative Building Technologies (IBTs).

The key points discussed centred around sustainable human settlements, challenges with IBTs, Role of regulatory bodies and community involvement. Regarding **Sustainable Human Settlements**: Craig Makapela underscored the importance of creating human settlements that align with the United Nations Sustainable Development Goals (SDGs). He emphasized the necessity to design communities where people live close to their workplaces to minimize travel. Dr. Amanda Filtane stressed the importance of using locally available materials and understanding the local context when defining sustainability. She also questioned why certain materials, like zinc sheets, are predominantly used despite not being locally produced. Professor John Babafemi advocated for the use of locally sourced and waste materials as viable alternatives to traditional, high-carbon construction materials like cement.

Regarding the Challenges with IBTs, Professor Pomponi noted that the challenge isn't necessarily with the materials themselves but rather their overuse and the lack of adaptation to various contexts. Professor Babafemi mentioned the need to ensure that alternative building materials are structurally sound and durable, while Dr. Amanda Filtane highlighted the issue of achieving economies of scale for alternative building technologies. She stressed that the initial cost of these technologies might be higher, but their long-term benefits could outweigh traditional methods. Craig Makapela emphasized the need for social acceptability and consumer education. He noted that people often resist new technologies in favor of familiar ones like brick and mortar.

Concerning the Role of Regulatory Bodies, there was a significant discussion about the role of regulatory bodies like the NHBRC. Craig who works for the regulator emphasized that the NHBRC's role is to ensure quality and safety through education and regulation. However, concerns were raised about the NHBRC's effectiveness in promoting and adopting IBTs, with some audience members expressing frustration over perceived inefficiencies. Furthermore, multiple speakers, including audience members, stressed the importance of Community Involvement in the planning and implementation of housing projects. This involvement ensures the acceptability and sustainability of new technologies.

The session concluded with an emphasis on the need for a holistic approach to sustainable settlements. This involves collaboration between regulators, developers, and communities, focusing on local resources and long-term benefits. The importance of education and patience in overcoming initial resistance to new technologies was also highlighted. The key takeaways from the session are that:

- Sustainability is context-specific; understanding and utilizing local materials is important.
- Consumer education and community involvement are vital for the adoption of IBTs.
- Achieving economies of scale for new technologies requires strategic planning and patience.
- Regulatory bodies play a critical role in ensuring quality and safety but need to be more proactive in promoting innovation.

Panel Discussion II: High Cost of Building Materials and Promoting Innovation in the Construction Industry, moderated by Dr. Kehinde Alade

The second panel discussion on the high cost of building materials and promoting innovation in the construction industry was moderated by Dr Kehinde Alade featured a diverse group of panellists:

- **Prof. Fidelis Emuze**: Central University of Technology, Built Environment, Sustainability.
- **Prof. Ayodeji Aiyetan**: Durban University of Technology, Innovation in Construction.
- **Craig Makapela (NHBRC)**: Regulation, Managing costs and innovation.
- **Zama Mgwatyu (Community Development)**: Development Action Group, grassroots engagement.
- **Melita Molala**: CEO, Vibrant Construction Company, Johannesburg.

The discussion highlighted the multifaceted challenges in the construction industry, emphasizing the need for collaborative efforts among researchers, regulators, industry players, and communities to drive down costs and promote the adoption of innovative building technologies. The session concluded with a commitment to address the identified barriers and work towards practical, sustainable housing solutions.

Melita Molala emphasised the importance of embracing Innovative Building Technologies (IBTs) to address the housing backlog (2.4 million) in South Africa and advocated for the inclusion of women in the construction industry and the implementation of the 30% government spend target on women-owned businesses. She highlighted that IBTs work globally and questioned why South Africa is slow to approve and adopt these technologies and encouraged local manufacturing of building materials to drive down costs and create jobs.

Zama Mgwatyu highlighted the socio-political challenges, including extortions in townships, affecting construction and stressed the need to understand and support

the informal sector, which comprises significant construction activity. He called for clearer communication and education on planning laws and the use of alternative technologies for community-based builders and advocated for access to capital and alignment of governmental systems with on-ground realities to foster sustainable development.

Prof. Fidelis Emuze suggested the use of evidence-based research that addresses real problems and influences policy and encouraged collaboration between researchers and communities to ensure practical and impactful research outcomes He proposed the adoption of methodologies like design science to build solutions with end-user participation. Prof. Ayodeji Aiyetan identified scarcity of raw materials and high production costs as major factors driving up the cost of building materials and emphasised exploring renewable materials and innovative technologies to replace traditional building materials. He also highlighted the need for research focused on durability, fire resistance, and other properties of new materials.

Craig Makapela of the NHBRC acknowledged the need for better communication and education about IBTs to builders and housing consumers and admitted that there has been a gap in sharing information and facilitating adoption of approved technologies. He stated that the NHBRC is committed to working closely with stakeholders to educate and train on the benefits and implementation of IBTs.

The audience raised concerns about the risk of project abandonment and the need for better planning and execution with the high cost of building materials. There was criticism regarding the slow adoption of innovative technologies by the government and the persistence of traditional methods despite available alternatives. There were also concerns about land classification and ownership changes that impact community settlements and housing developments. Notable points from the panel and audience interactions were the need for alignment between research outcomes, governmental policies, and community needs, advocacy for faster approval and implementation of IBTs to address housing deficits, and emphasis on creating sustainable, cost-effective housing solutions through local manufacturing and innovative technologies.

Panel Discussion III: Indigenous Architecture and Affordable Housing, moderated by Prof. Abimbola Windapo

The third panel discussion for Day 2 on Indigenous Architecture and Affordable Housing was moderated by Prof Abimbola Windapo featured a diverse group of panellists:

- **Dr. Iruka Anugwo**: Senior Lecturer, Durban University of Technology
- **Prof. Philippa Tumubweinee**: Associate Professor, University of Cape Town
- **Dr. Salie Mahoi**: Structural Engineer
- **Ms. Bernadette Rossouw**: Community Activist, Ocean View

The panel highlighted the importance of leveraging indigenous architecture principles using modern techniques to create affordable, sustainable housing that resonates with contemporary needs. This requires a shift in perception, educational curriculum changes, community involvement, and policy adjustments. The key themes drawn from the panel discussion revolved around indigenous architecture and the modern context; perception vs reality; practical implementation in communities; sustainability and education; and combining traditional and modern techniques.

Dr. Salie Mahoi emphasized the importance of perception when it comes to building materials. He highlighted those materials like adobe (mud bricks) and thatch, still used in wealthy areas like Constantia and Camps Bay, are considered premium, whereas in other regions, they are perceived as inferior. The conversation focused on the need for education and the demonstration of well-built structures using indigenous materials to change these perceptions. Concurring with the views of Dr. Mahoi, Ms. Bernadette Rossouw, representing the informal community of Ocean View, spoke about how she uses locally available materials to build their homes. She mentioned the importance of having a solid base due to the windy environment they live in and highlighted the practicality and necessity of using what is available. She also emphasized the need for policy changes to support such grassroots construction efforts.

Prof. Philippa Tumubweinee discussed how indigenous architecture is more about principles rather than appearance. She noted that using local materials isn't about recreating historical structures but adapting ancient principles to modern needs. She stressed that resistance to such materials often comes from misconceptions rather than practical shortcomings. The need for practical education came up, particularly the importance of getting construction and architectural students to engage in hands-on projects that utilize indigenous materials. Prof. Tumubweinee suggested that students learning by building shelters and other structures themselves is invaluable and should be incorporated into their formal education. This would bridge the gap between theoretical knowledge and practical application especially as it concerns indigenous architecture. Dr. Iruka Anugwo introduced the idea of creating hybrid construction practices that combine traditional and modern methods. This merges the durability and local adaptability of traditional materials with modern construction standards, potentially improving affordability and sustainability within the housing market.

The key points discussed centred around incremental building, spaces for dialogue and regulatory changes. Incremental building allows communities to construct their homes overtime, adding improvements as resources become available. Creating spaces for continuous community dialogue, which is crucial for sustainable development, noting that only through open dialogue can the real needs and effective solutions of the community be addressed. There are calls for a shift in policy to accommodate and recognize indigenous architecture and methods as viable options for urban housing. However, the mainstream acceptance of such methods requires support from both academic and regulatory bodies.

Panel Discussion IV: Bridging the Gap Between Academia and the Industry for Housing Development, moderated by Dr Kehinde Alade

Dr. Kehinde Alade moderated a dynamic panel discussion focusing on bridging the gap between academia and the industry for housing development. The session featured contributions from Dr. Amanda Filtane, Prof. Joannes John-Langba, Mr. Fabio Companie, Dr. Iruka Anugwo, and Mr. Mochelo Lefoka.

The key contributions from the panellists centred around Engaged Scholarship, Publication Practicality, Interdisciplinary Collaboration, the Triple Helix Model, Practical Experience, Generational Understanding, Project Based Learning, Community Engagement, Mentorship and Technical Skills. Dr. Amanda Filtane discussed her experience with UCT's Engaged Scholarship programme, which aims to link classroom activities with societal impact. The programme requires academics to translate their research into accessible formats, like infographics and pamphlets, to ensure the general public and communities understand and benefit from the research findings. She stressed the importance of disseminating academic knowledge in ways that communities can understand and use, emphasizing that publishing alone is not enough. While Prof. Langba highlighted the need for interdisciplinary collaboration, pointing out that social scientists and engineers must work together. He shared examples from his own research and involvement in projects that needed social science input to be effective. He reiterated the importance of the Triple Helix Model, which connects academia, industry, and government to facilitate innovation and overcome individual shortcomings.

Mr. Fabio Companie emphasized the importance of understanding the community's needs and the practical problems they face. He mentioned the necessity of improving informal settlements incrementally and understanding the local context for effective interventions. He supported a multi-generational approach to tackling housing issues, which focuses on long-term affordability and sustainability. Dr. Iruka Anugwo advocated for project-based learning as a means to bridge the gap between theoretical

knowledge and practical skills. He shared his experience of assigning live projects to students, which helps them develop real-world problem-solving skills. He emphasized the need for students to engage with communities, suggesting that curriculum review sessions with industry practitioners could enhance the relevance of academic programmes. Further, Mr. Mochelo Lefoka discussed the importance of mentorship in bridging the gap between academia and industry. He highlighted how aligning students with mentors in the industry can significantly enhance their practical learning experiences. He pointed out the disparity in valuing technical skills and emphasized the need to respect and improve the training of tradespeople to ensure the construction of adequate housing.

A participant emphasized the distinction between adequate housing and satisfactory housing, noting that regulations often define adequacy, but community satisfaction is driven by subjective perceptions and local context. A comment from an online participant addressed the stigma attached to graduates from certain institutions, suggesting that academics should work to break down these barriers for a more inclusive industry. The panel concluded that effective collaboration between academia, industry, and communities is crucial for developing sustainable housing solutions. Emphasizing experiential learning, respecting technical skills, and ensuring community engagement were identified as essential steps in bridging the gap between theoretical research and practical application.

Panel Discussion V: Practicalities and challenges of implementing Alternative Building Technologies (ABTs) in South Africa and beyond, moderated by Prof. Fidelis Emuze

The panel featured experts including both academic and industry professionals, bringing diverse perspectives on the adoption and challenges of ABTs for low-cost housing. The experts include: Pragasan Chetty,Robert Plattner, Michael Chikwava, John Matthews and Bob Hindle. Prof. Fidelis Emuze introduced the session, highlighting the need to address the gap in the adoption of alternative building technologies (ABTs), particularly technologies developed locally but implemented more successfully abroad.

Key topics that emanated from the discussions centred on Community involvement and Technology Acceptance' Regulatory Challenges, Economic and Business Considerations; Educational and Industry Integration; Infrastructure and Implementation; and exposition of Practical Examples and Success stories. Pragasan Chetty emphasized that many townships already use ABTs (albeit informally) and highlighted the importance of involving the community in decision-making to foster acceptance. While Bob Hindle raised the point that communities should decide what they need, implying that top-down approaches often fail to meet local needs effectively. Several panellists indicated that current regulations are rigid and act as barriers to implementing ABTs. A shift towards performance-based regulations was suggested. They discussed the role of regulatory bodies like Agrément South Africa and the need for these bodies to be more open and supportive of ABTs.

Robert Plattner discussed the challenges his company, Hydraform, faces locally compared to broader success internationally. He emphasized the commercial decision to operate where business is more feasible. Challenges were raised about government tender requirements and the lack of flexibility in emergency housing specifications, which often mirror those of permanent structures, thus nullifying cost benefits. John Matthews stressed the importance of educating both the community and professionals on the benefits and practicalities of ABTs, while Michael Chikwava highlighted

resistance within professions like architecture and civil engineering, where there is little incentive to deviate from traditional materials and methods. Panellists raised points about the need for adequate infrastructure to support the use of ABTs. For instance, ensuring proper soil types and mixes could significantly impact the longevity and durability of structures built using ABTs. Prof. Ogunlana mentioned the importance of having demonstration projects to showcase the benefits and practicality of ABTs in local contexts. Thereafter, the panel discussed various successful implementations of ABTs in different regions, highlighting the conditions and factors that contributed to their success including the importance of involving communities in the design and construction process to ensure that the end product meets their needs and gains their acceptance.

Members of the audience inquired about the suitability of different soil types for making blocks, and concerns were raised about the practical implementation of ABTs in various environmental conditions. Further, audience members and panellists discussed the role of government in facilitating the adoption of ABTs through regulatory flexibility and financial incentives. Finally, there was a call for more robust mechanisms to empower communities to dictate the types of structures that best suit their needs, especially when it comes to informal settlements. The panel discussion concluded with a consensus on the need for a more flexible regulatory environment, better educational outreach to both communities and professionals, and a collaborative approach that includes government, industry, and academia to streamline the adoption of alternative building technologies. The session underscored the importance of aligning technological innovation with community needs and regulatory frameworks to achieve broader acceptance and implementation of ABTs in housing development.

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