

An analysis of Open Science Education through Community Engagement for Higher Education Institutions (HEI) in Africa

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Abstract

The study aimed at analysing Community Engagement in Open Science for Higher Education Institutions (HEIs). However, empirical research on the motives of HEIs for such community engagement is lacking. This study adopted a qualitative methodology using the desktop approach based on exploratory design and a theoretical model by classical Sherry Arnstein's (1969) Ladder of Citizen Participation in developing this article. To get insights on what has so far been realized as far as open science, HEIs are concerned, a theoretical review was embarked on to collect data. Data was therefore collected using review of literature and document analysis. Then the data was analysed using narratives and descriptions. It was concluded that community engagement in HEI should be aimed at undertaking research, teaching and consultancy programs aimed at responding to societal needs and coming up with feasible strategies for meeting such community needs in the most efficient, effective, innovative and sustainable manner. It was therefore recommended that HEIs should therefore, use science shop models to undertake community engagements so as to come up with solutions that are in line with problems affecting the people in the community.

Keywords: Open science, Open access, Citizen science, Open innovation in science, Science shops and Community Engagement

INTRODUCTION

An international push for open science (OS) is ongoing. In 2012, New York Times rebranded the concept Science 2.0 as Open Science (Arwid, 2025). This was followed by policy documents from transnational and national institutions and think tanks in Europe and USA (Mirowski, 2018). A broader perspective was introduced in 2021 when UNESCO issued its recommendation on Open Science (UNESCO, 2023). Open Science sometimes called citizen's science that promotes scientific research, innovation, and evidence-based policies is an essential pillar of sustainable development in Africa. (UNESCO, 2025). In East Africa, the East African Science and Technology Commission (EASTECO) hosted a High-Level Multi-Sectoral National Open Science Dialogue for Academic and Research Institutions (Munyaradzi, 2025). In Tanzania, open science is still in its infancy, although certain steps have been taken in adopting it (Muneja, 2023). The uneven power relation between Higher Education Institutions (HEI) and the citizen scientists is not clearly stated in EU's Open Science framework. (European Commission, 2023). Beck et al. (2023) looks at Citizen Science as part of Open Innovation in Science. Strasser et al. (2019) question if Citizen science "really aims at empowering citizens through community engagement in relation to science" (Strasser et al., 2019). That's why, since the start of 2025, community engagement as part of open science has becoming more crucial than ever (Fillet, 2025).

Across the globe, a growing number of Higher Education Institutions (HEI) especially in European Union such as Vrije University in the Netherlands are the become increasingly interested community engagement through the use of science shop models (Anouk, Reinout, Maarten, 2024). Science Shops emerged in The Netherlands in the 1970s, facilitated by a favourable political context that allowed HEI staff and students to respond to research needs identified (Aina, Fredrik, Jacqueline, Broerse & Rosina, 2024). However, empirical research on the motives of HEI for such community engagement is lacking. Furthermore, the academic literature on the topic is dominated by Anglo-Saxon perspectives and studies reflecting the situation in the United States and the United Kingdom, with a lack of insights from other countries, particularly those in northwestern Europe (Anouk, Reinout, Maarten, 2024). The state-of-the-art review conducted by Benneworth et al. (2018) shows that the discussion has been ongoing for quite some time but there is the lack of progress in the debate over the past 35 years (Benneworth et al., 2018). A number of studies argue that HEIs play a crucial role in responding to societal needs, and can further enhance their societal impact at local, national and international levels through community engagement (Farnell, 2024). Community engagement at macro level focuses on large-scale initiatives that influence policy, systems, and societal structures to improve community well-being (Lee, 2025).

It emphasizes participatory approaches, where community members actively contribute to decision-making and project implementation (Tarek, 2020). As stated in the UNESCO recommendation on Open Science, we must ensure "reciprocal access to science for all producers and consumers of knowledge regardless of their location, nationality, race, age, gender, income, socio-economic circumstance, career stage, discipline, language, religion, disability, ethnicity, migratory status or any other grounds (United Nations, 2025). As a result of the increasing globalization and marketization of higher education institutions, many such institutions have seemingly become detached from their local surroundings (Benneworth, Culum, Farnell, Kaiser, Seeber & Šćukanec, 2018). This may reduce HEI' (perceived) contribution at a local level, an effect that has led to a growing demand for evidence of their societal impact and contribution to the public good.

This study was guided Ladder of Citizen Participation (Sherry, 1969). However, empirical research on the motives of HEI for such community engagement is lacking. Furthermore, the academic literature on

the topic is dominated by Anglo-Saxon perspectives and studies reflecting the situation in the United States and the United Kingdom, with a lack of insights from other countries, particularly those in northwestern Europe (Anouk, Reinout, Maarten, 2024). The state-of-the-art review conducted by Benneworth et al. (2018) shows that the discussion has been ongoing for quite some time and that it is broadening to include other countries; however, this review also observes the lack of progress in the debate over the past 35 years (Benneworth et al., 2018). The objective of the study was to analyze the process of stakeholder participation in community engagement by Higher Education Institutions

LITERATURE REVIEW

An international push for open science (OS) is ongoing. In 2012, New York Times rebranded the concept Science 2.0 as OS and British Royal Society released a PR document titled Science as an Open Enterprise (Arwid, 2025). This was followed by government white papers and policy documents from transnational and national institutions and think tanks in Europe and USA (Mirowski, 2018). Since 2016, OS has been a centrepiece of EU's strategy to become an innovation union, with its large-scale research programs Horizon 2020 and Horizon Europe between 2021 and 2027 (European Commission, 2023).

Theoretical Framework for community engagement by HEI

This study was guided by the classical Sherry Arnstein's (1969) *Ladder of Citizen Participation Theory*. There are several theories community engagement but all built around this classical theory. This theory is premised on the assumption that citizen participation in community engagement is a categorical term for citizen's power (Stout, 2004). The theory puts it that there are different forms and contents of community engagement in public affairs all of whom do not measure up to the same end results. The theory identified broad categories of participation starting from non-participation, tokenism and real citizen power.

Accordingly, community engagement exists in form of a ladder with the lowest rungs resulting in non-community engagement; the middle rungs representing tokenism while upper rungs of the ladder represent real citizen power. Sometimes community engagement in public affairs is an empty ritual with no real powers to affect both outcomes and processes. The classical poster of French students in 1968 that has since widely been circulated in participation literature, highlighted that community engagement without power redistribution leads to powerlessness and empty frustrations. This type of participation in community engagement only benefits those in power to erroneously claim that all public interests were considered yet only their sides benefited.

This is the basis of the theory of Ladder of Citizen Participation in community engagement. Manipulation and Therapy lie at the bottom rungs of the ladder constitute "non-participation in community engagement" whose objective is to enable people in power to "educate" or "cure" participants but not to enable them participate community engagement through policy dialogue so as to plan for development of better public policies. The third rung (informing), the fourth rung (consultation) and the fifth rung (placation) represent "tokenism" and participants' voices start to hear and be heard in public affairs although they have to powers to ensure that those in power will adhere to their views. Real citizen power lies in the seventh rung (delegated power) and eight rung (citizen control) when the under privileged gain majority seats in decision-making and full managerial power.

In the analysis and review of all the above participation theories, community engagement is premised on Sherry Arnstein's (1969) *Ladder of Citizen Participation theory*. Arnstein's theory can be chosen because it gives a generalised theoretical framework of citizen participation in community engagement and most of the other theories mentioned above, are only a critique and additions to this theory. Besides, the different ladders of participation in community engagement as suggested by this theory are evident in Africa's participatory governance systems.

The international experience of open science and open access

The institutional prehistory of Open Science goes back to 2000s in policies on e-government, later to conceptually become open government. UN started the process in 1997, and EU and USA developed the notions further (Golub & Lund, 2021). The general idea early on was to ensure participation by making data and information available for free use and reuse (Nelhans & Nolin, 2022). A broader perspective was introduced in 2021 when UNESCO issued its recommendation on Open Science, stressing social and cultural inclusion and sustainability, as well as promoting opportunities for innovation through community engagement (UNESCO, 2023). This tradition of scientific openness was often, except for Bernal, ambivalent to capitalism.

The same ambiguity exists today. On the one hand, the Open Access (OA) movement and Open Science advocates are critical of capitalist and state access barriers to research, and warned already in 1985 about the scientific, social, and economic dangers of commodification and policies that obstructed the participation and access to knowledge (Leonelli, 2023). On the other hand, the openness movement also wants to empower traditional research sharing with new online technologies that accelerate scholarly communication and connects it "to the temporal dynamic of capitalism that requires constant acceleration of economic growth" (Haider, 2018).

And currently, national research grant councils and politicians, supported by the Finch report in 2012, nearly unanimously emphasizes Open Access's role in ensuring "maximum economic and social impact" (Wellen, 2013). Leonelli holds that parts of Open Science today are "increasingly aligned" with the publishing industry, and innovation and economic growth are emphasised by both private and public institutions that supports OS (Leonelli, 2023).

Open Science, scientific research, innovation, and evidence-based policies in Africa

Open Science that promotes scientific research, innovation, and evidence-based policies is an essential pillar of sustainable development in Africa. Leveraging the potential of basic sciences, engineering, and emerging technologies is crucial to addressing global challenges and accelerating progress toward the African Union's Agenda 2063 and the United Nations Sustainable Development Goals (SDGs). With young Africans projected to constitute 42% of the world's youth by 2030, enhancing science literacy, research, and innovation is vital to harnessing this demographic dividend (UNESCO, 2025). However, scholars across Africa face unique challenges in accessing research, which stems from various factors, including rising subscription fees and lack of access to scientific equipment.

That's why since their inception, Open Access and open science have been focused on increasing access to knowledge for those who need it most in Africa. In East Africa, the East African Science and Technology Commission (EASTECO), Tanzania's Commission for Science and Technology (COSTECH), Public Library of Science (PLOS), and Training Centre in Communication Africa hosted

a High-Level Multi-Sectoral National Open Science Dialogue for Academic and Research Institutions in Tanzania in mid-February 2023 to discuss the matter – three years after the initial decision to enter into a partnership that would promote open-science principles in the region (Munyaradzi, 2025). The 3rd East African Community (EAC) Regional Science, Technology, and Innovation (STI) Conference, held from 6 to 8 March, 2024 in Nairobi, Kenya, marked a significant milestone for the region with the launch of the East African Regional Science, Technology and Innovation Policy 2023-2033 and the East African Regional Intellectual Property (IP) Policy 2023-2033 (East African Community, 2025).

In Tanzania, open science is still in its infancy, although certain steps have been taken in adopting it for example the adoption of open access practices, including the creation of institutional repositories and the adoption of policies that direct its implementation. Currently, HEIs, have adopted and used open journal publishing systems, particularly the online journal system (OJS). The published journal articles through journal systems are freely accessible online like other open-access content, however, the journals are not yet registered in the Directory of Open Access Journals (DOAJ) despite the fact that some are already indexed in different abstracting services such as Africa Journal Online (AJOL) and they have Digital Object Identifiers (DOI). The policy interface of open science needs to be harmonized and COSTECH is strategically positioned to take the lead (Muneja, 2023).

Community engagement by Higher Education Institutions (HEIs)

Despite the challenges associated with community engagement in HEI, a number of them have now developed policy frameworks to facilitate understanding of the concept among internal stakeholders and put structures for managing community engagement initiatives (Mohale, 2023). Following the global trend of enacting HEI–community engagement initiatives, a growing number of Dutch HEI now include societal engagement in their mission statements and strategic plans (Van der Meulen et al., 2019).

In Africa, HEIs are being encouraged to foster social responsibility and community engagement in their teaching and research activities over the past decade (Santhosh, Sahayaraj, Binesh & Preethi, 2025). A number of studies argue that HEIs like ESAMI play a crucial role in responding to societal needs, and can further enhance their societal impact at local, national and international levels through community engagement (Farnell, 2024). Most of across the world are becoming increasingly interested and active in fighting social inequality, restoring trust, and strengthening social cohesion at a local level (Farnell, 2020).

These HEI aim to engage with and provide benefits to the communities in which they are located using activities such as service-based learning, participatory research, and student volunteering (Goddard, Hazelkorn, Kempton and Vallance, 2016). This phenomenon, known in the academic literature as “Higher Education Institution–community engagement,” “local engagement,” “community outreach,” or “community–university partnership,” is receiving ever more attention from policymakers and academics (Anouk, Reinout, Maarten, 2024).

Interestingly, this increase in attention to the local societal contribution of HEI is taking place at a time when HEI are also expected, more than ever, to have a global impact through their activities in research and education (Goddard et al., 2016). The latter focus is a product of the growing influence of marketization on higher education as declining public investment causes HEI “to rely on market discourse and managerial approaches in order to demonstrate responsiveness to economic exigencies (Anouk, Reinout, Maarten, 2024).

A specialized approach to academic research, teaching, and learning known as community engagement by HEI entails actively involving communities in cooperative initiatives that improve university teaching, learning, and research objectives while also addressing the needs and opportunities of the community (Kisambira, Babirye & Aniku, 2025). Many studies have shown the bidirectional relationships between the individual and collective blessings of volunteering, such as, for example, greater involvement in neighborhood decision-making, increased self-efficacy, leadership, empowerment and sense of community (Ohmer, Amy, Michele & Deborah, 2025).

The Education White Paper 3 locates community engagement within the policy changes of transformation in higher education, but more studies reveal that there is still considerable resistance to accepting community engagement as a core function of HEI (Mohale, 2023). Interventions that engage communities have been shown to improve health and wellbeing in disadvantaged groups internationally, but there is little evidence on current community-led practice, particularly in relation to the process of community engagement (Bagnall, South, Kinsella, Trigwell, Sheridan & Harden, 2025).

As a result, community engagement has been recommended as an important consideration for research projects to enhance informed consent and exchange knowledge between researchers and community members (Wanje, Koech, Mai, Mwashigadi, Kombo, Maitha, Barreh, Hiten, Vidler, Craik, Marie, Dadelszen, Temmerman & Precise Network (2025). Community engagement is the process of building sustainable relationships through trust and collaboration that strengthens community well-being (Tabia, Bailey, Michener, 2025). Community engagement allows reconnection to social capital and has considered other benefits to community well-being such as increasing community resilience, and even just identifying with the community is a driver for volunteerism and social involvement (Ohmer, Amy, Michele & Deborah, 2025).

Community engagement offers a respectful way of addressing persistent challenges faced by society and supporting vulnerable populations and thus holds key for ongoing global priorities such as emerging responses to environmental uncertainties such as climate change (Marco, Elizabeth, Sandra, Ounkham, Thongkhon, Hironori & Shogo, 2025). community engagement includes activities to ensure that community representatives are involved in developing, delivering or managing services to promote, maintain or protect the community's wellbeing (Bagnall, South, Kinsella, Trigwell, Sheridan & Harden, 2025). Community engagement required flexibility and creativity to access the mobilizers and leaders for briefings with the research team (Kaawa, Muyomba, Sheila, Semakula & Sewankambo, 2025).

Community engagement through participation in social activities such as volunteering lead to increased personal and collective well-being, which can include high levels of sense of community (Ohmer, Amy, Michele & Deborah, 2025). Community engagement can involve varying degrees of participation and control: for example, giving views on a local health issue, jointly delivering services with public service providers (co-production) and completely controlling services (Bagnall, South, Kinsella, Trigwell, Sheridan & Harden, 2025).

METHODS AND MATERIALS

This study adopted a qualitative methodology using the desktop approach based on exploratory design and a theoretical model by classical Sherry Arnstein's (1969) Ladder of Citizen Participation in developing this article. According to Steward (1984), a theoretical approach can be used in instances where empirical study is not possible. To get insights on what has so far been realized as far as open

science, open access, open innovation in science, citizen science, community science and science shop model for community engagement by HEIs are concerned, a theoretical review was embarked on to collect data. Data was therefore collected using literature review and document analysis. Then the data was analysed using narratives and descriptions.

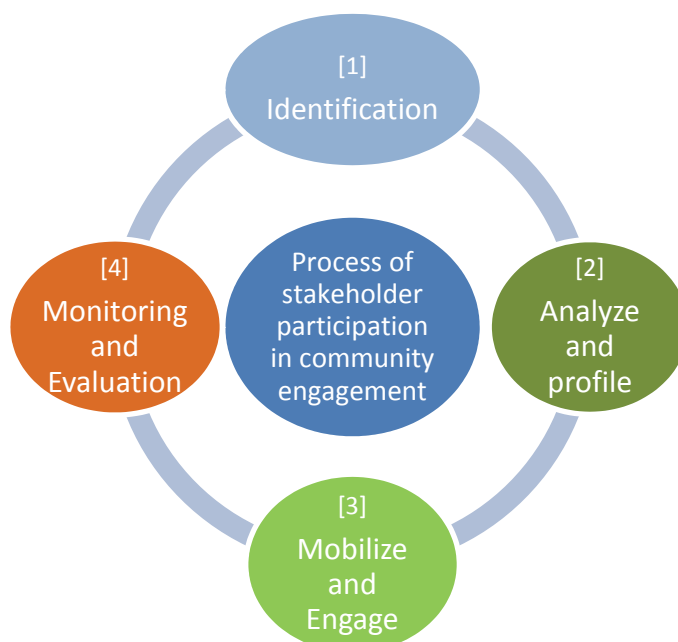
To ensure dependability, the study collected data from reports of reputable peer reviewed scholarly journal articles, bibliographies, conference papers and published reports on open science, open access, citizen science, open innovation in science, science shops and community engagement by Higher Education Institutions. From first contact documents, additional articles and documents were identified and reviewed. The secondary sources used mainly included reports, articles and news items on open science, open access, citizen science, open innovation in science, science shops and community engagement by Higher Education Institutions.

RESULTS AND DISCUSSION

The process of stakeholders' participation in community engagement by HEI

Effective participation of stakeholders in community engagement by HEI needs to be undertaken using a structured approach. The approach usually starts with identification of stakeholders to participate in community engagement and usually ends with monitoring and evaluation of their level of participation in community engagement. Monitoring and evaluation focus on the extent to which stakeholders have been engaged in HEI activities of teaching, training, research and consultancy and provides lessons for reflective learning and practices. The lessons form part of the knowledge base for future stakeholder participation in community engagement practices.

Figure 1: Model for systematic stakeholder participation in community engagement process



Source: World Bank (2017).

DESCRIPTION OF STAKEHOLDER PARTICIPATION IN COMMUNITY ENGAGEMENT PROCESS BY HEI

1. Stakeholder identification

Stakeholder identification is a process of selecting persons and institutions who are interested, influenced and impacted by the project. To identify stakeholders that can participate in HEI community engagement process, there is need for a range of interventions to aid such a process that include;

- i. Review of project documents
- ii. Review of legal, regulatory and institutional frameworks
- iii. Snowballing/identified by preliminary identified project stakeholders
- iv. Brainstorming
- v. Review of previous similar project documents
- vi. Use of panel of experts/Delphi method (industry based, mix of professions/industry of practice, communities of practice)

2. Analyse and Profile

The stage of stakeholder analysis and profiling builds on stakeholder identification. Through the interventions listed at stakeholder identification stage, HEI can Identify a range of stakeholders namely; primary, secondary and connected/tertiary.

Primary stakeholders. The primary stakeholder has direct benefit, interest, power, influence and can be directly impacted by the HEI's projects and their outcomes. The HEI projects in the areas of teaching, training, research and consultancy usually have direct impact on their livelihoods, health and their status has direct /immense contribution to the success or failure of any HEI project.

Scenario 1: Renovation of a road to head office of any HEI may have to identify the following stakeholders to participate in community engagement for such road innovation.

- Drivers
- Pedestrians
- Cyclists
- Road side business community (market vendors, shop/mall owners)
- Landowners
- Local leaders
- Community (schools, parents etc)

Secondary stakeholders. While some stakeholders are directly impacted by the HEI road renovation project, others usually referred to as secondary stakeholders may be beneficiaries with also some interest, power, influence and can be indirectly impacted by the project. In some cases, their livelihoods are not dependent on the project neither its outcomes.

Scenario 2: Road construction project for any HEI country office

- Local area political leaders (Member of Parliament,
- Religious and cultural institutions
- Civil society
- Environmentalists
- Political parties
- Private Sector Federations /for example Private Sector Foundation of Uganda
- Media
- Wildlife

Connected stakeholders. Connected stakeholders are usually undocumented but tend to have legal bonds with the project organisation. These may include, contractors, subcontractors etc. For instance, in HEI renovation project at the head office, shareholders of the company that sub contracts the terracing of HEI compound flower gardens (with the agreement) may assume the category of connected stakeholders.

Tertiary stakeholders

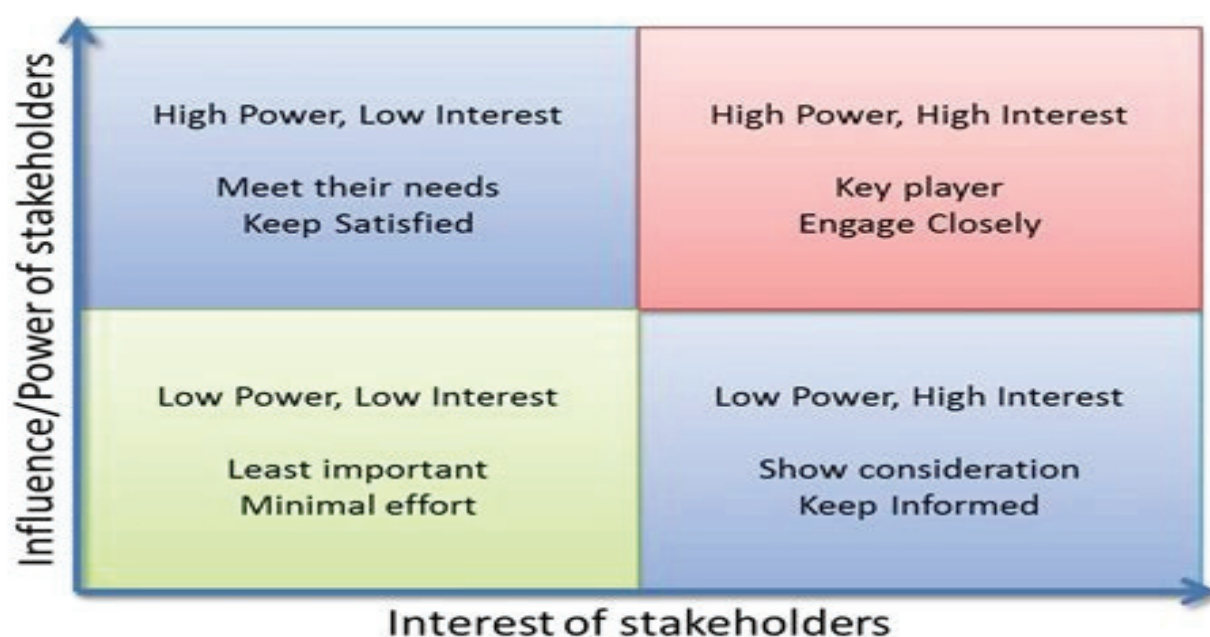
Are stakeholders that have significant influence on the success of the HEI project. They are also critical partners due to their power.

Scenario 3: Tertiary stakeholders in renovation of HEI multi-purpose building in any country

- Project funders
- Project implementers
- Government
- Regulators

Once stakeholders have been identified they should be classified using stakeholder mapping tool. The tool seeks depending on their relative power and influence in the HEI project. A power/interest matrix can be adopted to classify the relative power and interest of the identified stakeholders. A diagrammatic representation of stakeholder mapping tool is provided in figure 8.

Figure 2: Diagrammatic representation of a stakeholder mapping tool



Source: Mendelow (1991)

Figure 8 shows the various classes of stakeholders and how they interact to arrive at sound decision making. Those with high power/influence and high interest are key players and they have to be closely involved in community engagement by HEI and informed at every step in the process.

Those with low power/influence and low interest are the least important and will only have to be informed. Those stakeholders with high power/low interest and low power/high interest will have to ensure that their needs are met, and some consideration shown towards them and at the same time informed of the process so that they participate fully in community engagement

3. Mobilize & Engage

Stakeholder mobilization

Mobilization is a precursor for good stakeholder participation in community engagement. Mobilization refers to the art of getting stakeholders together before making them to participate in engagement. Mobilization requires the understanding of two categories of stakeholders: stakeholders to aid mobilization and stakeholders to engage.

a) Stakeholders to aid mobilization

The stakeholder to aid mobilization refer to stakeholders that provide linkages to access those to be involved in community engagement. Such stakeholders are usually trusted, influential and command respect among a wide spectrum of targeted stakeholders by any HEI project. For example, community and opinion leaders (political, religious, retired) social media influencers and bloggers from the different member states of HEI.

b) *Stakeholders to engage*

These refer to a group that is specifically targeted for the participating in community engagement activities of teaching, training, research and consultancy that HEI does such as students, lecturers, researchers, consultants, administrators, caterers, suppliers, management, boarder, financiers, regulatory bodies, policy makers, politicians, environmentalists, implementing partners, development partners, neighbouring institutions, media, religious institutions and cultural institutions.

Such key stakeholders are the ones that can be brought on board by HEI in open science, open access, citizen science, open innovation in science and science shops and their immediate communities in which they are located so that they can be involved in community engagement on the social impacts and implications as far as opportunities and threats of the project are concerned.

Since stakeholders may be dispersed, the implementers may require community and opinion leaders to organize people in the community to appear at a certain location and time for the purpose of engagement.

Key success factors for mobilization

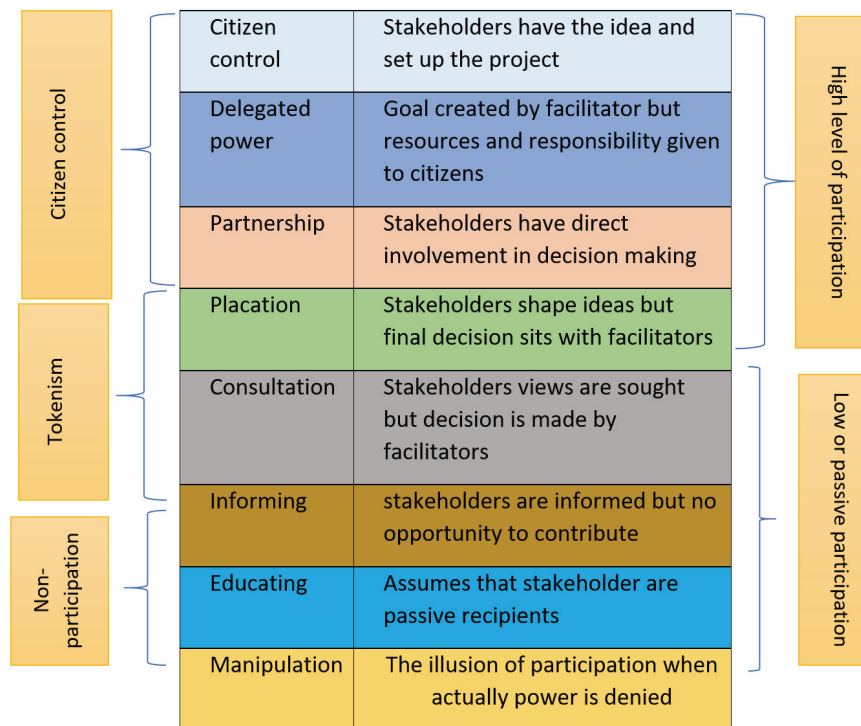
- Appropriate message matters (hint- “what is in there for them”, language, etc)
- Appropriate mode of communication, channels and mode of mobilization
- Deployment of opinion leaders

Stakeholders’ participation in community engagement by HEI

While previously hinted on, stakeholder’s participation in community engagement by HEI is used to refer to “an inclusive process conducted throughout any by HEI’s project lifecycle”. The aim of stakeholder’s participation in community engagement is to ensure that stakeholders become inspired, motivated, involved and actively participate in the project and its initiatives.

Effective stakeholder’s participation in community engagement requires the appreciation of the engagement ladder and the level of engagement at each stage of the project cycle. It is important to note that people’s level of participation depended on the stage in which they are involved. The participation ladder developed by Arnstein (1969) is now widely used for guiding effective participation during engagement.

Figure 3: Stakeholder's Participation Ladder in Community Engagement by HEI



Source: Arnstein(1969)

The participation ladder in Figure 8 above, illustrates the different levels of stakeholders' participation in community engagement. This depends on the level of participation for stakeholders in community engagement. The ladder is developed based on experience of participation levels of stakeholders in community engagement.

It is critical for stakeholders to be involved in community engagement for effective implementation of any by HEI academic, research and consultancy projects and the ladder it provides options for practitioners to identify sustainable levels of participation in such community engagements to enable stakeholders actively own and sustain projects and initiatives. Stakeholders should be conditioned to move from non participation through tokenism to citizen control level if stakeholders' participation in community engagement is to yield maximum outcomes in terms of inspiration, motivation, and active involvement. It is also important to note that stakeholders can participate in community engagement in several ways.

Approaches to stakeholders' participation in community engagement by HEI

A range of approaches have been deployed and considered effective when involving stakeholders in community engagement for the conception, initiation, planning, designing, implementing, monitoring, evaluating, managing and sustaining any by HEI academic, research and consultancy project, namely;

- Market soundness (project popularisation) through road shows, radio talks show, television talk shows
- Project inception meetings

- Advocacy meetings (roles and responsibility, space for mobilisation, formation of committees,
- Project progress implementation review meetings with community
- Barazas
- Community radio announcements
- Public hearings (notices key)
- Social media platforms
- Announcements /talks at community gatherings- church, funeral, market days, cultural events
- Periodicals in newspapers
- Policy briefs.

Communication for stakeholders' participation in community engagement process

- Develop communication strategies
- Language for communication must be in the local dialect or one that is widely spoken within the community
- Strategies for communicating issues must be effective and inclusive
- Means of communication must be clear, simple and concise.
- The language used must be clear, concise, objective and free of technical jargon
- All forms of communication channels must be used to inform the general public.
- A reliable and efficient feedback system to inform participants on regular basis.
- Time and Venue for the engagement process must be effectively communicated to the public

To gauge whether the approaches listed have delivered impact, there is need for project implementors to undertake monitoring and evaluation.

4. Monitoring & Evaluation

As enlisted by Patrinos (2014)., “you cannot manage what you can't measure”. Applied in stakeholders' participation in community engagement, it is difficult to manage stakeholders' participation in community engagement program if we cannot measure their impact. Therefore, monitoring and evaluation of stakeholders' participation in community engagement extremely very critical if not fundamental.

Performance indicators used in monitoring and evaluating stakeholders' participation in in community engagement program may include percentage of Project Affected Persons (PAPs) Versus those invited for community engagement and levels of participation and involvement community engagement.

CONCLUSION AND RECOMMENDATIONS

Study findings indicated that community engagement in HEI is aimed at undertaking research, designing and implementing the teaching curriculum, then doing consultancy work that aims at responding to societal needs and how to come up with feasible strategies for meeting such community needs in the most efficient, effective, innovative and sustainable manner. In this case, the different activities of HEI institutions such as teaching, training, research and consultancy should be community needs driven so

as to come up with education products and services that very relevant in solving society problems. This study therefore contributes to the role of HEI in community engagement, as well as the intricate relationship between community engagement and the marketization of higher education. In offering an empirical perspective on community engagement in HEI, the study contributes to a field lacking in empirical evidence.

More specifically, our findings illustrate the effects of the public debate on the role of HEI in community engagement. In addition, HEI undertake community engagements through use of science shop models. In essence, the work of HEI should always be citizen centric in terms of ensuring that the different citizens and members of society or community should be involved in the different activities of the HEI through various participatory approaches that promote community engagement. Therefore, HEI should always design and develop science shop models that are in line with the principals of open science, open access, open innovation in science, citizen science and community science, where different needs citizens or members of the society or community are put into consideration when designing policies, standards, regulations, procedures, guidelines, codes of conduct and specification, programs, projects and operational manuals for conducting teaching, training, research and consultancy.

This will enhance their societal and community impact at local, national and international levels gaining a deeper insight into the factors driving community engagement and its manifestations. HEI should therefore, use science shop models to undertake community engagements so as to come up with solutions that are in line with problems affecting the people in the community. Based on our results, we therefore offer a model of how ESAMI participates in community engagement and the relationships between this practice and her operations. Finally, this study provides insight into how community engagement is understood and operationalized by HEI, adding a new perspective to the research literature in this area, which is dominated by Anglophone cases. In summary, the HEI's community engagement identifies a hybrid framework of participatory governance for service delivery to the various stakeholders. Secondly, the most contributing elements in community engagement by HEIs include conducting research, consultancy, teaching and training.

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