Scholastic Research Publications, SRP Group®
International Journal of Humanities Science Innovations and Management Studies
Volume 2 Issue 4, Pg. No. 1-17, July-August, 2025
IJHSIMS-V2I4P101, Doi: https://doi.org/10.64137/30508509/IJHSIMS-V2I4P101

Original Article

From Searching to Optimizing: Assessing the Grassroots Innovation Journey in Tanzania

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Received Date: 23rd May 2025 Revised Date: 06th June 2025 Accepted Date: 22nd June 2025 Published Date: 08th July 2025

Abstract - In Tanzania, grassroots innovators face significant challenges in fully realizing the benefits of their innovations, with only a small fraction successfully navigating the entire innovation journey. This paper assesses the stages experienced by selected grassroots innovators in Tanzania, employing a cross-sectional design. Quantitative data were gathered through a semi-structured questionnaire from 221 innovators, chosen from the Tanzania Commission for Science and Technology (COSTECH) database and participants of the National Competition for Science, Technology and Innovation (MAKISATU) from 2020 to 2022, as well as those from the Dar es Salaam International Trade Fair Exhibition (SABASABA) in 2021 and 2022. Key informant interviews and observations were conducted to enhance the data collection process and identify various prototypes corresponding to the innovators' stages. Innovators were selected from eleven sectors based on their progression stages. Analysis revealed that approximately 90% of grassroots innovators do not advance through the innovation journey, primarily due to a lack of understanding of the necessary stages. Among the remaining 10% who reached the final stage, none were able to fully capitalize on their innovations. The study highlights the need for targeted strategies to support Tanzanian grassroots innovators in optimizing their innovations' benefits, which could significantly contribute to the country's socio-economic development. By addressing the knowledge gaps and providing necessary resources, it is possible to enhance the success rate of grassroots innovations in Tanzania.

Keywords - Grassroots innovators, Grassroots innovation journey, Innovation, Optimization, Tanzania.

1. Introduction

Innovation is a crucial key aspect in social economic development globally and it increases its importance as the demands of the global economy increase in terms of competitiveness, growth and employment (Sousa and Ferreiro, 2020; Dempere *et al*., 2023; Lema and Perez, 2024; UNCTAD/TIR, 2021). Oslo Manual guidelines for collecting and interpreting innovation data, defines the term 'innovation' as "a new or improved product or process (or a combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users or brought into use by the unit**"** (OECD/Eurostat, 2018**).** In addition, innovation can be conceptualized as a process but the act of moving an idea from stage to stage is essentially a journey (Participate, 2018; Barnes and Conti, 2021). Looking an innovation as a journey is helpful as it identify clearly specific skills associated with innovating successfully to improve products and services (Chen and Viardot, 2019). According to Participate, (2018) and Barnes and Conti (2021) innovation journey can be understood as a process which comprise of five stages namely; searching/ideation, exploring, committing, realizing and optimizing.

According to Barnes and Conti (2021) searching/ideation is the first stage in the grassroots innovation journey which comprises of hunting and gathering ideas and opportunities for innovation. Exploring is the second step in an innovation journey where by the ideas and opportunities are organized, debated and

analysed in order to understand them in depth. Committing is the third stage in the innovation journey which focuses on what to do and not what not to do by omitting ideas that are not chosen or are outmoded in order to provide resources for innovation. Realizing is the fourth stage in the innovation journey entails with results-oriented and delivering of the innovation of which the innovative products are ready for the market. Optimizing is the last stage in the innovation journey where innovators are setting up everything that is needed to develop and utilize or produce the innovative idea. Although these stages developed based on studies undertaken in developed countries, they do not necessarily reflect all events in developing countries; however they are useful for examining the innovation process in developing countries (Barnes and Conti, 2021). By considering and identifying those stages it can be useful for any innovators including grassroots innovators.

According to Hossain (2016), Raj *et al*., (2022), Maldonado-Mariscal (2023) and Smith *et al*., (2021) grassroots innovators emerges from the knowledge, experience and skills embedded in communities and individuals who lie outside the formal institutions of education, research and industry for solving local problems. In developing countries, grassroots innovation are pervasive due to large informal economies, their innovations are used to address challenges that directly or indirectly influence society lives and often create solutions to everyday societal issues that governments fail to address (Smith *et al*., 2021). Grassroots innovation has historically been a critically understudied research topic, studies on innovations have been provided limited attention, especially on developing countries in general (Smith *et al*.,2021.; Maldonado-Mariscal, 2023). There is a wide variety of research available on innovation that provides valuable insights on innovation in general ((Barnes and Conti, 2021; Kump and Fikar, 2021) . However, there is a scarcity of in-depth studies on the problems confronting grassroots innovators in their innovation journey.

The aim of every innovator including grassroots innovators is to accomplish the innovation journey successfully by addressing local situations and often achieve sustainable development for social economic development of any county(Valtonen *et al*., 2023; Koottatep *et al*., 2021). Accordingly to Barnes and Conti (2021) and Tidd and Bessant (2015), innovation journey can be termed successfully when there is successful exploitation of new ideas into the market. However, Edwards (2012) argue that innovating beyond the core is necessary for every innovator to guarantee success. In Tanzania the majority of grassroots innovators fail to accomplish the innovation journey successfully (COSTEH, 2023). For example, COSTECH (2023) observed that, out of 236 grassroots innovators supported by COSTECH from 2019 to 2023, only 30 of them were succeeded to commercialize their innovation products and services. This is in line with COSTECH strategic plan of 2020/2021 – 2025/2026 on increasing more effort on commercialization of innovation outputs by 2025 (URT, 2021).

The study by Diyamett and Mabala (2007) reported that in Tanzania despite the fact, there are individuals, especially in the informal sector, who are innovating to the extent of coming up with the innovation products, those innovations are not diffused into the market successfully. This paper will provide empirical evidence and insights into the challenges, processes and dynamics experienced by grassroots innovators. Understanding the barriers and enablers of grassroots innovators can lead to the design of more effective policies and initiatives to promote innovations for socio-economic development.

2. Materials and Methods

The study was conducted across four regions: Dar es Salaam, Arusha, Morogoro and Mbeya, leveraging the Dar es Salaam International Trade Fair Exhibition (DITF) 2023 and the Nane Nane Agricultural Exhibition 2023 as strategic data collection points. Grassroots innovators who did not participate in these exhibitions were contacted via mobile phones to obtain relevant data. The data collection period spanned from July 2023 to April 2024, with contact information for the innovators sourced from the COSTECH database. Upon reaching out, the innovators provided updates on the progress of their innovations.

A cross-sectional research design was employed, enabling the collection of data from different grassroots innovators at various stages of their innovation journey during a specific period (Bechhofer and Paterson, 2012). Although the innovation journey is inherently sequential, this design was suitable for assessing different stages across a diverse group of innovators simultaneously, rather than tracking individuals over time.

Quantitative data were collected using a semi-structured questionnaire administered to a total of 221 grassroots innovators. These innovators were selected using a combination of purposive and probability sampling techniques. The selection process involved identifying innovators from three main sources: the Commission for Science and Technology (COSTECH) Innovators Database, the National Competition for Science, Technology and Innovation (MAKISATU) databases for the years 2020, 2021 and 2022, and those who participated in the 45th and 46th Dar es Salaam International Trade Fair (DITF) exhibitions held in 2021 and 2022. From these sources, the total population of grassroots innovators operating at the realizing stage of the innovation journey was established, comprising 82 innovators from the DITF exhibitions and 207 innovators from the MAKISATU databases. Notably, all samples drawn from the MAKISATU and DITF databases were in the realizing stage and were also drawn from the same nine sectors later used in purposive sampling—namely Agriculture, Information and Communication Technology (ICT), Environment, Energy, Engineering, Education, Health, Security and Water.

Given that both the DITF and MAKISATU populations were less than 10,000, Cochran's (1977) correction formula for finite populations was applied at a 5% margin of error to determine the appropriate sample sizes. Using this formula, a sample of 68 respondents was drawn from the DITF population of 82, and a sample of 137 respondents was drawn from the MAKISATU population of 207. The formula used is;

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Where

- **n** = Corrected sample size
- $\mathbf{n_0}$ = sample size for an infinite population (typically 384)
- **N** = population size

For the DITF population of 82:

$$n = \frac{384}{1 + \frac{384 - 1}{82}} = \frac{384}{1 + 4.67} = \frac{384}{5.67} \approx 68$$

For the MAKISATU population of 207:

$$n = \frac{384}{1 + \frac{384 - 1}{207}} = \frac{384}{1 + 1.85} = \frac{384}{2.85} \approx 137$$

In both cases, the innovators were selected using simple random sampling through the lottery method. Each name was coded, written on a piece of paper, folded, placed in a box and randomly drawn to ensure fairness and eliminate bias. In addition to these, 16 grassroots innovators were purposively selected from the same nine sectors mentioned above, whose innovations were at various stages of the innovation journey other than the realizing stage. This approach ensured a comprehensive representation across innovation stages and sectors. Therefore, the final sample size for this study consisted of 68 innovators from the DITF, 137 from the MAKISATU databases, and 16 purposively selected innovators, making a total of 221 respondents.

Secondary information's was collected from published and unpublished materials to capture relevant information's on grassroots innovation journey in Tanzania. These materials included COSTECH strategic plans, quarter reports, guidelines, legislation, policy briefs and research articles, MOEST policy and guideline, TPSF annual plan and guideline, BRELA and COSOTA laws and guidelines, VETA and SIDO guidelines, Dar es Salaam Institute of Technology (DIT) and (NIT) guidelines in promoting grassroots innovators. The aim was to gather information's on the current status of the grassroots innovation journey in Tanzania. The collected quantitative and qualitative data were analysed by using strategic marketing concept known as customer analysis (Figure 1). This type of analysis was used to analyse the existing situation per each stage in the grassroots innovation journey.

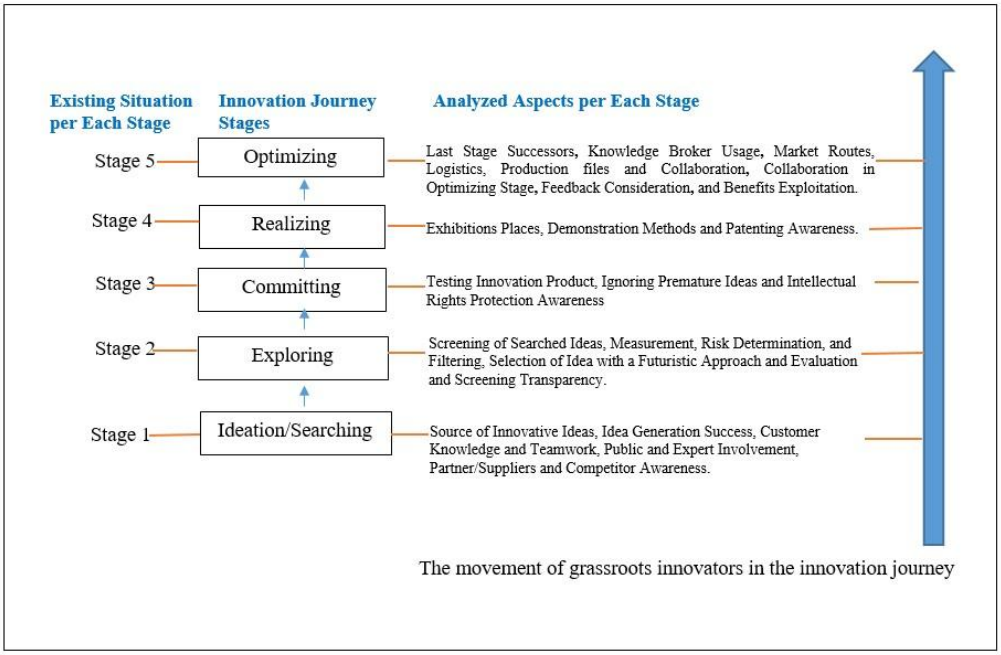

Fig. 1 Stages Passed By Selected Grassroots Innovators in the Innovation Journey

3. Results and Discussion

3.1. Ideation/Searching Stage: Laying the Foundation

The ideation or searching stage marks the foundational step in the grassroots innovation journey, serving as the phase where innovators actively hunt for and gather ideas and opportunities that could later be transformed into tangible solutions. In this study, the stage was analyzed through several interconnected dimensions, including the origin of innovative ideas, the total number of ideas generated, the number of stages each innovator had completed, awareness of customers, teamwork capacity, public and expert involvement, as well as awareness of competitors and suppliers. The evidence drawn from 221 grassroots innovators provides a clear depiction of both their creative potential and the challenges they face in transforming ideas into viable innovations.

3.1.1. Sources and Origins of Innovative Ideas

The findings reveal that personal experience was by far the dominant source of innovative ideas, with 180 innovators (81%) citing it as the primary inspiration. In comparison, 37 innovators (16%) identified community challenges as their main source, while only 4 innovators (3%) drew on indigenous knowledge. This dominance of personal experience suggests that most innovations emerge from individual encounters with needs or problems rather than from a collective assessment of broader societal challenges. This trend reflects the observation of Smith et al. (2021), who emphasize that grassroots innovations should ideally address issues that directly or indirectly affect community welfare. While personal experience offers valuable authenticity, relying predominantly on it risks narrowing the scope of innovation to the innovator's personal perspective rather than a community-wide benefit.

3.1.2. Idea Generation Success and Variety

A closer look at the idea generation process reveals a significant limitation: only 4 innovators (2%) reported producing more than one idea during the ideation stage, while the overwhelming majority, 219 innovators (98%), generated only a single concept. This lack of multiple options reduces opportunities for comparison, refinement, and selection of the most promising ideas. As Ucler et al. (2017) point out, effective ideation requires generating, collecting, and assessing several ideas before filtering them down for further development. Perers (2021) reinforces this by stressing that a portfolio of ideas enhances the chances of selecting high-quality, impactful innovations. The study's findings imply that limited ideation breadth may lead to missed opportunities, with innovators potentially committing early to underdeveloped or less competitive concepts.

3.1.3. Customer Knowledge and Teamwork Dynamics

The data indicates that all 221 innovators (100%) lacked knowledge of their potential customers' needs and preferences at this stage. This gap significantly undermines the market relevance of their ideas, as understanding the end-user is central to aligning innovation with demand (Barnes & Conti, 2021). Without insight into customer demographics, behaviors, and satisfaction levels, innovators risk developing solutions that fail to resonate in the market (Gilligan et al., 2020).

Teamwork was also found to be minimal, with 219 innovators (99%) working in isolation and only 2 innovators (1%) collaborating in teams. This isolation contradicts established evidence that team-based collaboration fosters diverse perspectives and cross-pollination of ideas, which are critical for generating breakthrough innovations (Paulus et al., 2011; Generation, 2021). Smith et al. (2021) further note that hybrid teams comprising individuals from different backgrounds are particularly effective at both generating and evaluating innovative ideas. The absence of teamwork in this study highlights a critical weakness in the grassroots innovation ecosystem, as collaboration could significantly enhance creative capacity and problem-solving depth.

3.1.4. Public and Expert Involvement

Encouragingly, a large majority of innovators—190 respondents (85%)—reported involving the public to collect information and feedback on their ideas. This aligns with participatory innovation principles, where early community engagement strengthens the relevance and acceptance of innovations (Fernandes et al., 2021). Similarly, 190 innovators (85%) also sought technical input from experts such as COSTECH, VETA, SIDO, DIT, NIT, and university researchers. Expert involvement plays a vital role in providing the technical grounding necessary to move ideas toward prototype development (Cooper & Edgett, 2012).

However, interviews revealed that not all expert engagements resulted in comprehensive support. A COSTECH officer explained that support is contingent on specific eligibility criteria, such as the potential for industrial application or the readiness of an idea for prototyping. This means many innovators fail to meet the threshold for support, limiting the value of these interactions. As Fernandes et al. (2021) observe, technical collaborations must be strategic and capacity-oriented to ensure that innovators not only receive advice but also actionable guidance toward development.

3.1.5. Partner, Supplier, and Competitor Awareness

Strikingly, none of the 221 innovators engaged with potential partners or suppliers at the ideation stage. This omission deprives them of critical resources, market knowledge, and logistical support that could strengthen their innovations (Perers, 2021). Suppliers, in particular, can contribute specialized expertise and insights into production feasibility, cost optimization, and market entry strategies.

Similarly, none of the innovators were aware of their competitors. This absence of competitive intelligence increases the risk of duplicating existing solutions and reduces the likelihood of differentiation in the market. Abba (2021) argues that studying competitors not only helps innovators avoid redundancy but also exposes them to strategies and methods that can inspire creative improvements. The lack of such awareness in the present study suggests vulnerability in market positioning for grassroots innovators.

3.1.6. Integrated Interpretation

Taken together, these findings paint a picture of an ideation stage that is rich in personal motivation but constrained by narrow idea generation, insufficient market orientation, and limited collaborative engagement. While public involvement and expert consultation are relatively high, the lack of customer understanding, team synergy, supplier engagement, and competitor awareness points to a systemic weakness in the innovation pipeline.

Theoretically, these results align with the innovation funnel model, where the breadth and diversity of ideas at the early stage are critical for the eventual quality and success of the final output. By generating few ideas, neglecting customer insights, and overlooking competitors, many grassroots innovators are entering the

innovation funnel with a limited and potentially suboptimal set of inputs. As Little (2023) notes, skipping critical exploration activities at this stage reduces the chances of identifying truly valuable and feasible ideas.

From a practical standpoint, strengthening this stage requires deliberate interventions such as structured ideation workshops, market research training, and facilitated collaboration networks that can expand the scope, diversity, and strategic depth of grassroots innovators' idea generation processes. By integrating customer needs, team collaboration, supplier relationships, and competitor intelligence into the early innovation journey, innovators can build a stronger foundation for later stages, increasing both the relevance and resilience of their innovations.

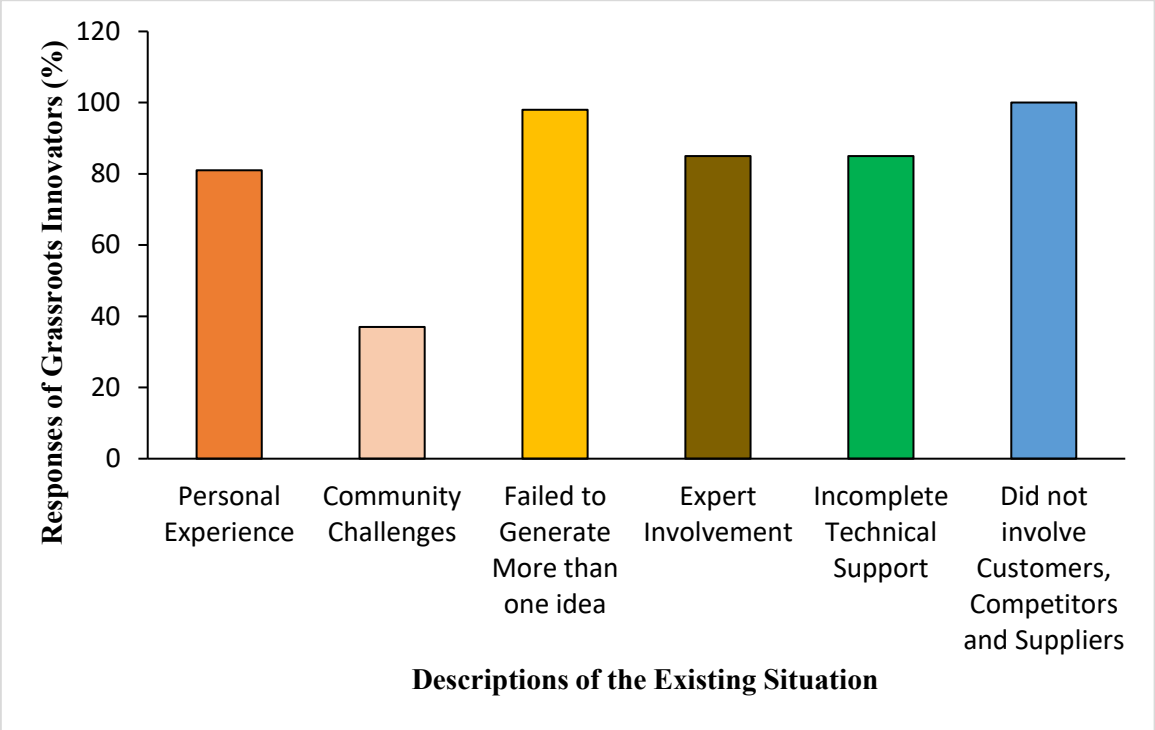

Fig. 2 Ideation/Searching Stage: Laying the Foundation Source of Innovative Ideas (N=221)

3.2. Exploring Stage: Refining Ideas and Ensuring Viability

The exploring stage represents a critical step in the grassroots innovation journey, bridging the gap between idea generation and the structured development of viable concepts. It is at this stage that innovators are expected to refine, test, and validate their initial ideas, discarding those that lack feasibility while retaining those with clear potential for future success. This stage demands analytical rigor, market awareness, and forward-thinking vision, yet the study's findings indicate significant gaps in its execution among grassroots innovators.

3.2.1. Screening of Searched Ideas

The data reveals a substantial shortcoming in the adoption of systematic screening processes. Out of the 221 grassroots innovators interviewed, 217 innovators (98%) did not screen their searched ideas, moving directly from ideation to implementation. Only 4 innovators (2%) engaged in any form of idea screening. This overwhelming tendency to bypass the screening process suggests a prevalent misunderstanding or underestimation of its value. As Booysen (2010) notes, many grassroots innovators lack clarity on the sequential steps of the innovation journey, resulting in skipped stages that compromise the overall innovation outcome.

For the small minority who did screen their ideas, the reasons cited were consistently practical: measuring the potential benefits of each idea, identifying associated risks, filtering out non-viable concepts, and avoiding unnecessary resource expenditure. These innovators recognized that screening serves as a safeguard, ensuring that only ideas with a strong potential for positive impact advance to the next stage. Hossain (2016) reinforces

this view, emphasizing that screening is essential for optimizing limited resources—both financial and temporal—in grassroots innovation contexts.

3.2.2. Selection of Ideas with a Futuristic Approach

Despite some screening activity, forward-looking selection was rare. Among the 4 innovators who screened their ideas, only 25% selected concepts aligned with future trends and technological advancements, while the remaining 75% failed to incorporate a futuristic perspective. This points to a shortfall in strategic vision during the exploring stage, where the focus should extend beyond immediate feasibility to consider the evolving market landscape, technological shifts, and societal needs. Valtonen et al. (2023) highlight that innovation screening should not only assess current viability but also ensure long-term relevance and adaptability, as market conditions and consumer preferences can shift rapidly.

The absence of a futuristic approach can lead to the premature obsolescence of innovations, reducing their capacity to compete or deliver sustained value. Grassroots innovators, therefore, risk investing in solutions that may meet short-term goals but fail to survive in changing environments, diminishing their overall contribution to economic and social development.

3.2.3. Evaluation and screening transparency

Transparency in the evaluation and screening process was another area of concern. All 4 innovators who engaged in screening believed that they conducted the process transparently. However, the data indicates that 100% of these innovators excluded key stakeholders from the process particularly those who had contributed ideas during the ideation stage. Furthermore, no feedback was provided to these contributors, creating a communication gap that can discourage future idea sharing.

This lack of inclusivity and feedback reflects a deeper issue in innovation culture. Effective screening not only filters ideas but also serves as an opportunity for collaborative learning, reinforcing trust among contributors and encouraging continued participation (Valtonen et al., 2023). When idea originators are excluded from the evaluation process, the result is often reduced team cohesion and missed opportunities for refining concepts through diverse perspectives.

Insights from a COSTECH officer further illuminate this challenge:

"*Almost all grassroots innovators who come to COSTECH present only one idea. Those with more than one idea often lack the knowledge or tools to evaluate them, and most do not provide any feedback after receiving technical assistance from the ideation stage*." (Key Informant, COSTECH, 12th July 2023)

This underscores the finding that inadequate screening knowledge contributes to the omission of the exploring stage entirely, heightening the risk of pursuing underdeveloped ideas. Such practices contradict the innovation funnel model, where a broad set of ideas is progressively narrowed down to those with the greatest potential for market success and long-term value creation (Cooper & Edgett, 2012).

3.2.4. Integrated interpretation

The results collectively suggest that the exploring stage is the most underutilized and misunderstood phase in the grassroots innovation process. By failing to systematically screen ideas, most innovators enter subsequent stages with untested and potentially flawed concepts. For the few who do screen, the absence of a futuristic outlook and stakeholder engagement diminishes the quality and inclusiveness of decision-making. From a strategic perspective, the exploring stage is where innovators should apply structured evaluation methods such as cost-benefit analyses, risk assessments, and market trend mapping to ensure only the most promising and future-proof ideas advance. Involving stakeholders from the ideation stage in this process fosters transparency, builds trust, and encourages knowledge sharing, all of which are essential for sustained innovation.

Practically, interventions to strengthen this stage should focus on capacity building in evaluation techniques, fostering forward-thinking design principles, and embedding participatory decision-making into grassroots innovation ecosystems. Training innovators in screening frameworks, providing access to market intelligence, and developing feedback mechanisms would not only improve idea quality but also contribute to

a culture of continuous learning and refinement. Thus, refining ideas at the exploring stage is not merely a procedural necessity it is a strategic imperative that determines the viability, longevity, and impact of grassroots innovations. Skipping or underperforming in this stage leaves innovators vulnerable to wasted resources, market irrelevance, and missed opportunities for transformative change.

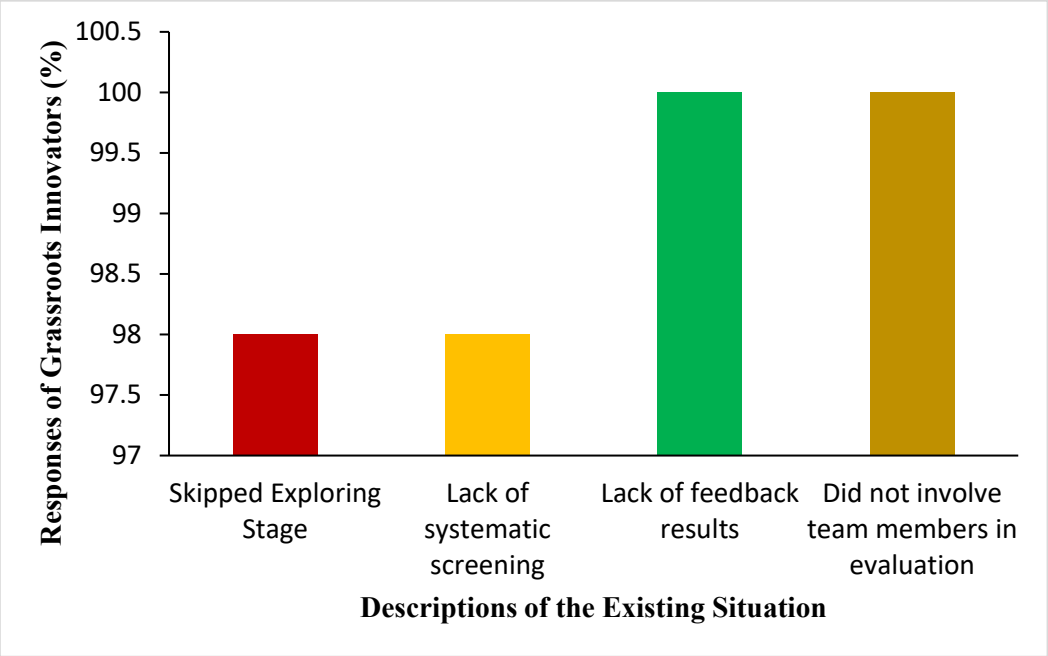

Fig. 3 Exploring stage: Refining ideas and ensuring viability (n=221)

3.3. Committing Stage: Testing, Refining, and Protecting Innovations

The committing stage is a decisive phase in the grassroots innovation journey, representing the transition from conceptualization to practical implementation. At this stage, innovators are expected to validate their concepts through structured testing, refine them based on evidence and feedback, and safeguard them through intellectual property (IP) protection. The underlying objective is to ensure that resources are invested only in concepts with verified potential, market readiness, and adequate legal protection. However, the study reveals significant shortcomings in the execution of these critical steps, with far-reaching implications for innovation success.

3.3.1. Testing of innovation products

Out of 221 grassroots innovators interviewed, only 4 innovators (2%) reported conducting any form of product or concept testing after the screening process, while the vast majority 217 innovators (98%) did not engage in testing at all. This finding suggests that many grassroots innovators either bypass the formal validation process or conduct testing informally and without systematic methodologies.

In theory, testing at this stage should involve pilot studies, prototype trials, or small-scale market experiments to evaluate customer acceptance, determine pricing strategies, and gather user feedback. Verworn and Herstatt (2002) emphasize that committing-stage testing provides critical data on feasibility, market fit, and potential adoption rates, enabling innovators to refine their products before full-scale launch. Yet, the absence of such practices in most cases indicates a vulnerability to market rejection and wasted resource investment.

Interviews further revealed that innovators who did conduct testing tended to work individually, limiting the diversity of perspectives in interpreting results. Those in teams reported insufficient time allocation by team leaders for result analysis, undermining the purpose of the tests. Cooper (2015) and Barnes and Conti (2021) argue that effective committing-stage activities require deliberate allocation of time, personnel, and financial resources; otherwise, innovations may be launched prematurely or without the necessary refinements to ensure competitiveness.

3.3.2. Handling premature ideas

Interestingly, 100% of respondents reported that premature ideas—those deemed unfeasible for immediate implementation—were not discarded but instead set aside. While this suggests a recognition of their potential future value, there was little evidence of structured "idea banking" mechanisms for storing, revisiting, and reassessing such concepts.

This approach aligns with the view of Dziallas and Blind (2019), who argue that not all innovative concepts fail due to inherent flaws; some simply require better timing, improved resources, or shifts in market demand before they can succeed. A well-maintained idea repository could allow innovators to strategically reintroduce such concepts when conditions become favorable, thus maximizing the return on earlier ideation efforts.

3.3.3. Intellectual property protection awareness and gaps

Perhaps the most concerning finding from this stage is the universal lack of intellectual property protection. All 221 innovators (100%) reported having no IP rights registered for their innovations. Furthermore, none of them were aware of the optimal stage for initiating IP registration, nor did they know of the institutions responsible for IP protection in Tanzania.

This lack of awareness leaves grassroots innovations highly vulnerable to idea theft, imitation, and exploitation without due credit or compensation to the original creators. COSOTA and COSOZA—mandated institutions for copyright and related rights in mainland Tanzania and Zanzibar—are legally empowered to safeguard innovations. Yet, as a COSOTA officer noted:

"*Among the major functions of COSOTA and COSOZA is to register copyright ideas from grassroots innovators in Tanzania mainland and Zanzibar. However, almost all innovators do not register their ideas despite regular education provided to them. They still regard COSOTA and COSOZA as relevant only for artist works*." (Key Informant, COSOTA, 7th August 2023)

This perception problem suggests that outreach and sensitization efforts by these institutions are either too limited or inadequately targeted at grassroots innovators. As a result, innovations are left unprotected during the very stage when they are most vulnerable to appropriation by external actors.

3.3.4. Integrated interpretation

The findings from the committing stage highlight a triple vulnerability that significantly undermines the innovation capacity of grassroots innovators. First, there is insufficient product testing, which compromises market readiness and increases the probability of product failure. Without systematic validation through methods such as pilot testing or prototyping, innovators risk launching products that have not been adequately assessed for customer acceptance, usability, or competitive positioning. Second, the unstructured handling of premature ideas results in the loss of opportunities for future development. While some ideas may not be feasible for immediate implementation, the absence of formal mechanisms to store and revisit them means potentially valuable innovations are forgotten or abandoned. Third, there is a complete absence of intellectual property (IP) protection, leaving innovations vulnerable to theft, imitation, and exploitation by external actors.

From a strategic standpoint, the committing stage should function as the quality filter in the innovation journey—ensuring that only well-tested, market-aligned, and legally protected ideas advance to commercialization. However, the lack of structured processes, insufficient technical guidance, and limited institutional awareness means that many innovators release underdeveloped products, neglect promising concepts, and fail to safeguard their ownership rights. This not only jeopardizes the success of individual projects but also weakens the overall resilience and sustainability of grassroots innovation.

Addressing these weaknesses calls for capacity-building interventions in three priority areas. First, testing methodologies must be strengthened by training innovators in systematic validation techniques, including pilot testing, prototyping, and structured user feedback analysis. Second, idea banking systems should be developed—digital or physical repositories where premature yet promising ideas can be stored, periodically

reviewed, and refined for future implementation. Third, IP rights education and facilitation should be expanded through targeted awareness campaigns, simplified registration processes, and the integration of IP advisory services into existing innovation support frameworks.

Ultimately, the committing stage is more than a procedural milestone—it is a critical safeguard for ensuring the quality, longevity, and ownership of innovations. Without strong practices in testing, refinement, and protection, grassroots innovators face the dual risk of market rejection and the erosion of their creative ownership. Such vulnerabilities not only undermine individual livelihoods but also threaten the growth and sustainability of Tanzania's broader innovation ecosystem.

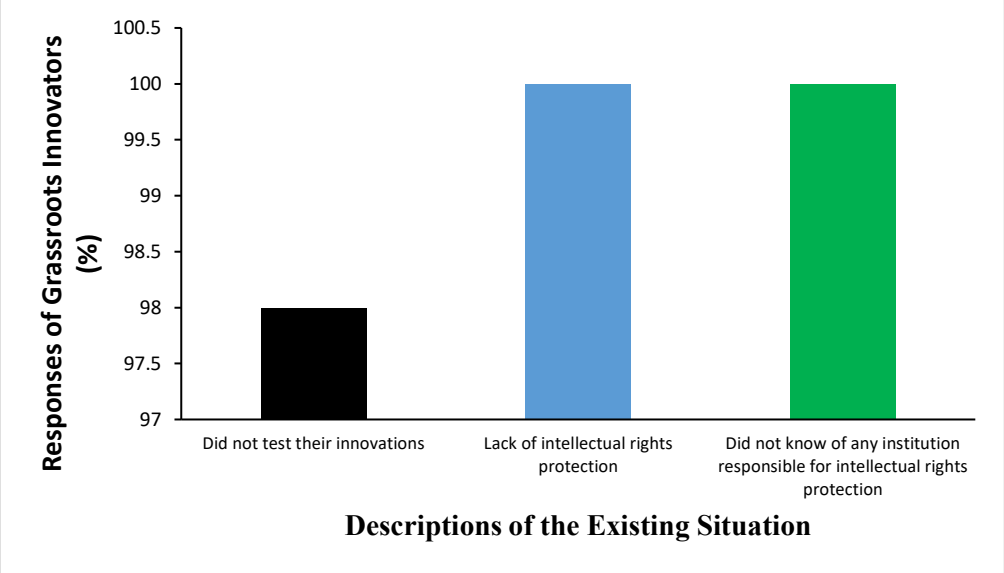

Fig. 4 Committing Stage: Testing, Refining and Protecting Innovations (n=221)

3.4. Realizing Stage: Transitioning from Prototypes to Market

The realizing stage represents the pivotal point in the grassroots innovation journey where concepts evolve into market-ready products or services. At this juncture, innovators move beyond ideation and prototyping into public demonstration, customer engagement, and potential commercialization. The focus shifts to showcasing value, creating visibility, and positioning innovations competitively in the market. This stage also provides an opportunity to protect innovations through patenting and other intellectual property measures—critical steps for sustaining the innovator's competitive edge and ensuring long-term benefits.

The study analysed six key aspects of this stage: exhibition participation, exhibition venues, demonstration methods, patenting practices, awareness of the appropriate patenting stage, and knowledge of institutions responsible for patenting in Tanzania.

3.4.1. Exhibition places

The results revealed that 211 out of 221 respondents (95%) had managed to exhibit their innovations, reflecting a high level of engagement in market visibility activities once the prototype stage was reached. Only 10 innovators (5%) reported not having exhibited their products, suggesting that physical showcasing is widely recognised as a vital step in building credibility and market traction.

A closer examination of exhibition venues shows that SABASABA emerged as the most prominent platform, utilised by 36% of innovators. SABASABA's prominence can be attributed to its reputation as a national trade fair that attracts diverse stakeholders, including investors, government agencies, and the general public, thereby providing high exposure potential. The second most common platform was MAKISATU, used by 31% of innovators, offering a more innovation-focused environment. NANENANE, primarily associated with agricultural innovation, accounted for 20%, indicating that sector-specific exhibitions play a vital role for innovators whose products align with the agricultural sector. TCU exhibitions represented 8% of exhibition

efforts, likely catering to academic and research-oriented audiences. Lastly, social media advertising was utilised by 5% of innovators, signalling a growing but still underutilised shift towards digital marketing strategies.

From a discussion perspective, these findings suggest that grassroots innovators prefer physical exhibitions over virtual platforms, possibly due to the tangible nature of most innovations, which benefit from hands-on demonstrations. However, this reliance on physical venues also exposes innovators to limitations such as budget constraints, geographic barriers, and selective institutional sponsorship. A COSTECH officer noted that not all innovators are supported to attend exhibitions due to financial and selection criteria constraints, which prioritise demand-driven, feasible, and scalable prototypes. This highlights a gap where many potentially market-ready innovations might never reach their intended audience without targeted financial and logistical support.

3.4.2. Demonstration methods

Of the innovators who had exhibited their products, 65% relied on motivational speakers to explain their innovations to audiences. This approach enables dynamic and personalised storytelling, which can be more persuasive than static displays, particularly for complex or unfamiliar products. Posters were the primary method for 13% of innovators, offering a cost-effective means of visual communication. Banners accounted for 10%, functioning mainly as branding tools to attract visitors to exhibition booths. Audio demonstrations were employed by 7%, while video demonstrations often considered powerful for capturing both process and outcomes were used by only 5% of innovators.

The discussion suggests that while motivational speaking is effective for engaging directly with customers, the underutilisation of videos and other multimedia may limit long-term reach, especially beyond physical exhibition events. Digital content could enable innovators to maintain engagement with audiences post-event, thereby extending marketing efforts without the need for constant physical presence. This finding underscores the need for training in blended demonstration approaches that combine in-person engagement with digital dissemination to maximise market penetration.

3.4.3. Patenting awareness

The study revealed a concerning gap in innovation protection. Out of 221 respondents, 200 (90%) had not patented their products or services, leaving them vulnerable to imitation and intellectual property theft. While 90% of respondents recognised BRELA as the institution responsible for patent registration, 8% confused its role with COSOTA which manages copyright and 2% confused it with COSTECH, which focuses on science and technology development rather than patenting.

The discussion indicates that although there is basic awareness of BRELA's existence, there is insufficient understanding of its functions, criteria, and processes for securing patents. This aligns with Diyamett and Mabala's (2007) observation that patenting in Tanzania remains a cumbersome and poorly understood process, particularly for grassroots innovators. Interviews with a BRELA officer revealed that many grassroots innovations fail to meet patentability requirements such as novelty, inventiveness, and industrial applicability, and that some innovators still believe patenting applies only to large-scale or high-tech inventions.

This confusion and lack of compliance with patenting processes severely limit the potential for innovators to monetise and safeguard their work. As UNCTAD/TIR (2021) emphasises, without strong intellectual property systems, the incentive to invest in innovation diminishes, weakening both the innovator's competitive position and the national innovation ecosystem.

3.4.4. Integrated interpretation

The integrated interpretation of the realizing stage highlights a combination of notable strengths and pressing vulnerabilities in the grassroots innovation process. The exceptionally high exhibition participation rate demonstrates that grassroots innovators understand the value of public visibility in advancing their innovations. Exhibitions provide opportunities to showcase products, attract potential customers, and gain recognition. However, the heavy dependence on traditional, physical exhibitions limits market reach,

particularly in an era where digital platforms can significantly expand audience access. The limited use of online channels and digital marketing tools, combined with inconsistent institutional support, constrains the scalability and sustainability of these innovations.

Demonstration strategies within this stage tend to focus heavily on direct engagement through motivational speaking, which, while effective in capturing audience interest, does not fully exploit the potential of multimedia and online dissemination methods. This underutilisation of digital tools reduces opportunities for continued visibility beyond the exhibition period, making it difficult for innovators to maintain momentum and market presence. A more critical concern lies in the complete absence of patent protection for most innovations. Without securing intellectual property rights, innovators remain vulnerable to exploitation, imitation, and loss of ownership over their creative work. While there is moderate awareness of BRELA as the institution responsible for patent registration, confusion over the functions of different institutions and insufficient understanding of patentability criteria severely hinder the uptake of legal protection mechanisms. This knowledge gap significantly undermines both the commercial and long-term survival prospects of grassroots innovations.

From a strategic standpoint, the realizing stage should extend beyond serving as a public showcase. It should function as a launchpad for market readiness, brand positioning, and the safeguarding of intellectual property. Achieving this requires three targeted interventions. First, diversifying market access is essential, with innovators encouraged and supported to participate in both physical and virtual exhibitions, including the provision of targeted subsidies for high-potential prototypes. Second, developing blended demonstration skills is necessary, enabling innovators to integrate live presentations with digital content such as videos, social media campaigns, and virtual demonstrations to extend their market reach. Third, strengthening patent facilitation programs will help simplify the registration process, establish dedicated intellectual property clinics for grassroots innovators, and integrate IP advisory services into broader innovation support initiatives.

Ultimately, the realizing stage represents a decisive turning point in the innovation journey. It is here that innovations either transition successfully toward sustainable market adoption or risk being prematurely celebrated yet easily replicated by others. Strengthening this stage is, therefore, not only vital for ensuring the long-term success of individual innovators but also for building a resilient, competitive, and secure grassroots innovation ecosystem in Tanzania.

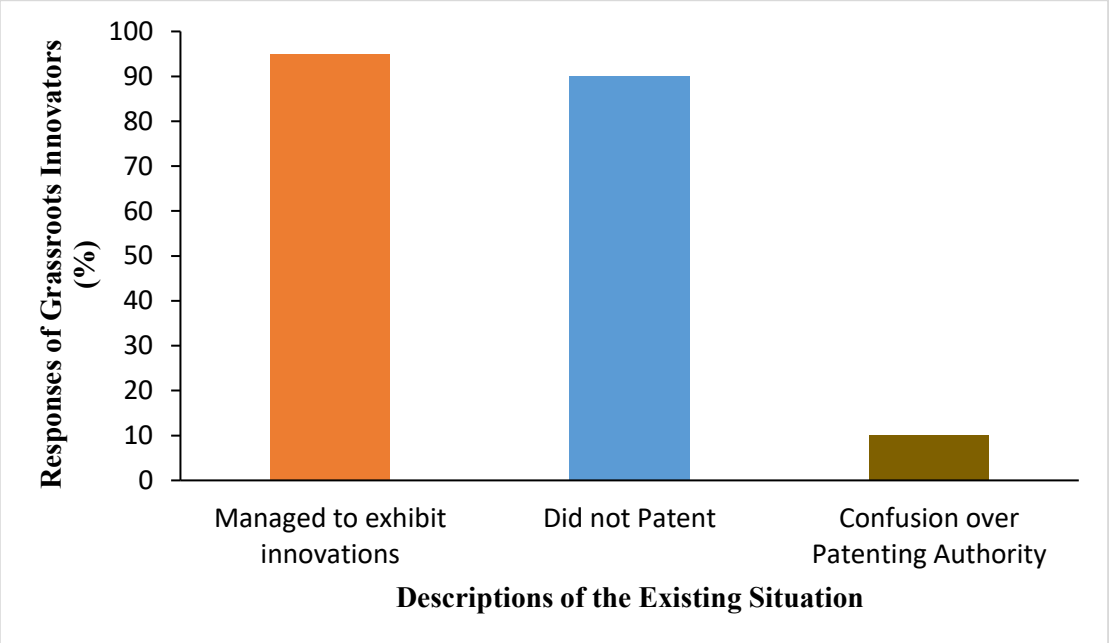

Fig. 5 Realizing Stage: Transitioning from Prototypes to Market (n=221)

3.5. Optimizing stage: Fully leveraging innovations for maximum impact

The aspects analysed at this stage were (Figure 6) the total number of interviewed grassroots innovators managed to reach the optimization stage, the capabilities of interviewed respondents to use knowledge broker during diffusion of the innovation to customers, and important aspects to be considered by grassroots innovators before the diffusion of the products, identification of different stakeholders used to collaborate with grassroots innovators for the diffusion of the products) and consideration of feedback from different innovation stakeholders .

3.5.1. Reaching the last stage and accruing benefits

The analysis shows that only 21 (10%) of the 221 interviewed grassroots innovators successfully reached the optimization stage, while a vast majority—200 (90%)—did not. Even among those who reached this stage, none managed to fully accrue the benefits of their innovations. This pattern reflects a systemic weakness in the Tanzanian grassroots innovation ecosystem, where the journey from idea conception to market optimization remains incomplete for most innovators. Reaching the optimization stage requires not only technical capability but also strategic market integration, which appears to be underdeveloped. These findings resonate with Dziallas and Blind (2019) and Chen et al. (2019), who stress that without a clear pathway for product commercialization, innovations often fail to achieve their intended market and societal impact. This gap indicates that the innovation pipeline in Tanzania is prone to attrition in the final stage, largely due to inadequate commercialization frameworks, weak post-prototype support, and insufficient integration into competitive markets.

3.5.2. Knowledge broker usage

The results reveal that none of the innovators who reached the final stage engaged a knowledge broker to support the diffusion of their innovations to customers. This is a critical shortfall, as knowledge brokers act as intermediaries who bridge the gap between innovators and target markets by translating technical features into consumer-friendly value propositions. Their absence suggests that grassroots innovators rely heavily on direct and often informal marketing channels, which limits product reach, slows adoption rates, and reduces the chances of scaling beyond local markets. As Barnes and Conti (2021) note, the diffusion of innovation requires deliberate communication strategies, and without professional mediation, valuable products risk market obscurity. The lack of knowledge broker involvement also points to limited awareness of their role and potential benefits within Tanzania's innovation landscape, highlighting a pressing need for targeted capacity-building and institutional support in this area.

3.5.3. Market routes, logistics, production files, and collaboration

Among the innovators who reached the optimization stage, 11 (54%) prioritized securing market routes before product diffusion, 5 (25%) prepared logistics, 1 (3%) required access to production files, and 4 (18%) engaged stakeholders, partners, or subcontractors. The dominance of market-route preparation suggests that innovators perceive distribution networks as their primary determinant of success. While this focus is valid, the relatively low proportion emphasizing logistics and production files implies that critical operational readiness is often overlooked. This can create bottlenecks when scaling production or responding to market demand. Moreover, the limited engagement with stakeholders indicates a narrow collaboration base, reducing opportunities for technical refinement, marketing expertise, and joint ventures. As Booysen (2010) argues, innovation sustainability depends on balancing product readiness with robust logistical and partnership strategies—something that remains underdeveloped among the studied grassroots innovators.

3.5.4. Collaboration in optimizing stage

Collaboration patterns among the 4 (18%) innovators who engaged stakeholders show that 35% partnered with COSTECH, 25% with industries, 20% with business service providers, and 15% with financial services. These collaborations demonstrate a recognition of the importance of external support in the optimization phase, yet the overall engagement rate remains alarmingly low. The predominance of COSTECH partnerships underscores the institution's central role in Tanzania's innovation support system, but the relatively low engagement with financial institutions reveals a missed opportunity for scaling through capital investment. In contrast, Tidd and Bessant (2013) emphasize that late-stage innovation success often depends on synergistic

partnerships that combine technical, financial, and market expertise. Expanding collaboration beyond COSTECH to include broader networks could significantly enhance the commercial viability and competitiveness of grassroots innovations.

3.5.5. Feedback consideration

Feedback mechanisms are vital for refining products before and after market entry. However, the study reveals that only 20% of innovators who collaborated with stakeholders considered their feedback, while a striking 80% disregarded it. This neglect undermines continuous improvement and may result in products that fail to align with evolving customer needs, market trends, or regulatory standards. Ignoring stakeholder insights also weakens trust and future collaboration potential. According to Valtonen et al. (2023), effective feedback loops are a hallmark of adaptive innovation systems, enabling products to remain competitive in dynamic markets. The absence of such mechanisms among grassroots innovators suggests a lack of structured post-launch evaluation processes, which limits both innovation quality and market adaptability.

3.5.6. Exploiting full benefits

Despite reaching the optimization stage, 100% of the 21 innovators failed to exploit the full benefits of their innovations. This includes missing opportunities to generate significant revenue, create employment, expand production, and contribute to government revenue through taxation. The inability to capture full benefits stems from weak commercialization strategies, inadequate market penetration, and limited access to investment opportunities. A COSTECH officer confirmed that current institutional support often ends at prototype development, leaving innovators without the resources or guidance necessary to commercialize successfully. Encouragingly, plans for the 2024/2025 financial year aim to extend support to commercialization, linking innovators with institutions such as CRDB Bank under the IMBEJU program to facilitate market entry and scaling. This shift aligns with UNCTAD/TIR (2021) and Barnes and Conti (2021), who argue that maximizing innovation benefits requires an ecosystem approach that integrates technical, financial, and market development support.

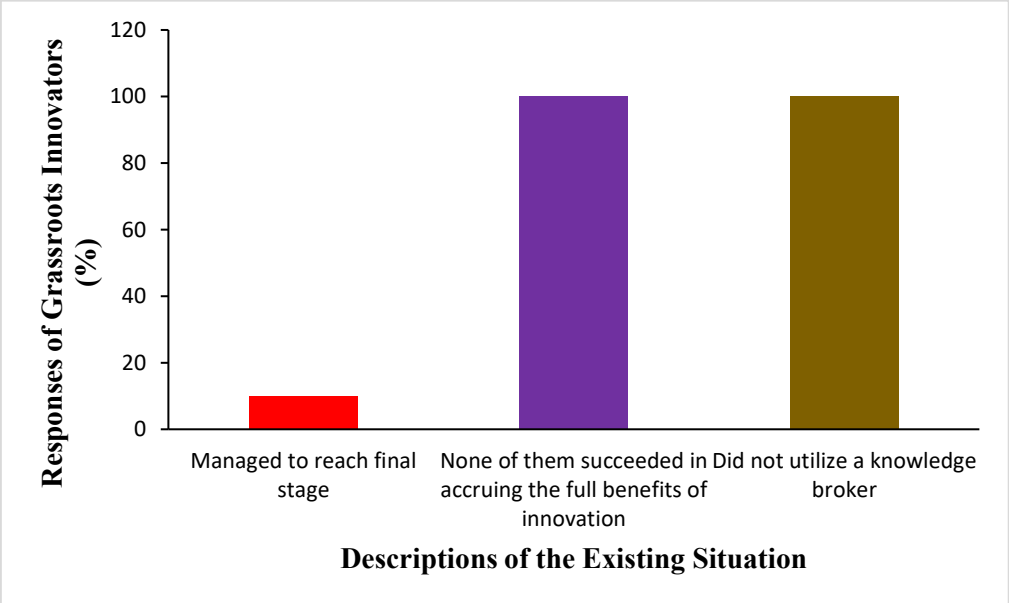

Fig. 6 Optimizing Stage: Fully Leveraging Innovations for Maximum Impact (n=221)

4. Conclusion and Recommendations

4.1. Conclusion

The study underscores the critical importance of ensuring that every grassroots innovator in Tanzania successfully completes the entire innovation journey. This is essential for unlocking the full range of benefits that innovations can offer, including tangible advantages such as value creation, increased employment

opportunities, higher wages, enhanced production capabilities, boosted exports, improved competitiveness of products and services, sustainable growth, and overall economic development.

However, the findings reveal a significant challenge: around 90 percent of grassroots innovators fail to complete the innovation journey, largely due to a lack of understanding of its stages. This high failure rate exposes a crucial gap in the innovation ecosystem, with only about 10 percent of innovators managing to reach the final stage. Even among those who do, all struggle to fully capitalize on the benefits of their innovations.

4.2. Recommendations

Address these challenges and assist grassroots innovators in maximizing the full benefits of their innovations, several recommendations are proposed. Regulatory authorities, such as COSTECH, should develop and implement targeted strategies to support grassroots innovators. These strategies should include educational initiatives aimed at increasing understanding of the various stages of the innovation journey, as well as improving access to resources like innovation hubs and incubators where the ideas can be changed to the market.

Additionally, establishing mentorship programs is crucial to help innovators effectively navigate the innovation journey. Creating a nurturing and supportive environment that offers comprehensive assistance throughout all stages of innovation, from ideation to market introduction, is essential.

By implementing these measures, grassroots innovators will not only reach the final stage of their innovation journey but also fully acquire the benefits of their innovations. This, in turn, will contribute to the broader goals of sustainable social economic growth and development in Tanzania.

5. Acknowledgment

The authors would like to express their profound gratitude to the Tanzania Commission for Science and Technology (COSTECH) for their generous financial support, which was instrumental in conducting the research that forms the foundation of this paper. This support enabled us to pursue and achieve our research objectives effectively. We are also deeply appreciative of the selected grassroots innovators and the various innovation stakeholders who participated in this study. Their enthusiastic and insightful contributions during the data collection process were invaluable. Their willingness to share their experiences, knowledge, and perspectives significantly enriched the quality and depth of our research findings. Additionally, we would like to thank our colleagues and institutional partners for their ongoing support and encouragement throughout the research process. Their constructive feedback and collaborative spirit greatly enhanced our work.

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