MAKE African European Maker Innovation Ecosystem

Blueprints of Change: Inspiring Journeys from the mAkE Ecosystem

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mAkE African European Maker Innovation Ecosystem

Introduction to a Journey of Impact and Innovation

The mAkE project has been a novel initiative that redefines how creativity, innovation, and collaboration can shape communities, businesses, and lives. Across Africa and Europe, makerspaces have become vibrant hubs of ingenuity—connecting people, fostering local solutions, and empowering change. This booklet is a celebration of that journey, capturing the transformative impact stories that illustrate the heart and soul of the mAkE project.

Through the lens of these stories, we witness makers from all walks of life transforming challenges into opportunities, armed with cutting-edge tools, innovative frameworks, and a shared vision for a sustainable future. From forging ventures that empower entrepreneurs to crafting policies that advocate for makerspaces as essential infrastructure, the mAkE project has demonstrated the great potential of collaborative ecosystems.

In this compilation, you'll encounter narratives that span continents and contexts, each showcasing the ingenuity, determination, and creativity of makers. You'll meet youth empowered with entrepreneurial skills, metalworkers introduced to new horizons, and communities energized by the possibilities of distributed manufacturing. These stories are more than individual successes; they are powerful reminders of what can be achieved when people, ideas, and technology come together.

Highlights of the mAkE project's achievements include:

- Building tools like the Open Catalogue of Business Models and the Venture Building Handbook to create resilient, financially sustainable makerspaces.
- Fostering cross-continental collaborations, as seen in the Makers in Residence program.
- Elevating the maker movement to global policy discussions, advocating for inclusion, education, and innovation.
- Revolutionizing local production through distributed manufacturing, bridging the gap between makers and markets.
- Empowering trainers to amplify knowledge and create ripples of change through Train-the-Trainer programs.

This booklet serves as a tribute to the impact of makerspaces, a source of inspiration for communities striving to replicate this success, and a call to action for all stakeholders — policymakers, innovators, investors, funders and collaborators — to support and sustain the maker movement. These are not just stories; they are blueprints for a better tomorrow, built one maker at a time.

Welcome to the mAkE journey. Let these stories inspire you, challenge you, and move you to imagine what we can achieve together.

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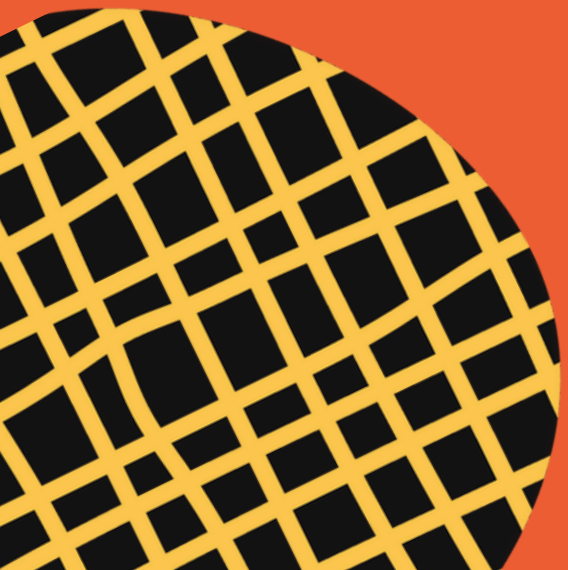
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The rise of distributed manufacturing

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01

An open catalogue of business models



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Building Financially Sustainable Makerspaces Through the Open Catalogue of Business Models (OCBM)

As makerspaces continue to inspire innovation and empower communities, financial sustainability remains a key challenge. The Open Catalogue of Business Models (OCBM), developed through collaborative input from global makerspaces, offers a flexible solution. This "living document" is designed to help makerspaces adapt business strategies that align with their unique objectives, cultural contexts, and community needs. By providing modular business model elements, the OCBM enables makerspaces to craft tailored paths toward sustainability.

The Concept Behind OCBM: A Toolkit, Not a Template

Makerspaces thrive when sharing stories of innovation, learning, and community impact; however, discussions on financial sustainability are typically more reserved.

> *"We saw the need for something like a buffet — that people running makerspaces can browse through to gain ideas, choosing elements that seem relevant to what they are trying to create. This is the idea behind the OCBM.." ---Anna Sera Lowe,* Manufacturing Change Ltd, creator of the OCBM---

Co-Creating the OCBM: Input from a Global Community

The OBMC was co-developed with input from 50 representatives from makerspaces and distributed manufacturing organisations across Africa and Europe, ensuring it reflected a wide spectrum of business models and entrepreneurial insights. The inputs were compiled with the assistance of **Martin Oloo,** CEO of Fablab Winam, and **Gertrude Mawuena Goh,** researcher into the marketing practices of makerspaces.



A Path Forward: Expanding OCBM's Reach

There is strong interest in expanding the programme to include more makerspaces, particularly across Africa. Available at **Localeconomies.org** the OCBM is continuously updated, incorporating new insights and case studies to support a diverse array of makerspaces worldwide.

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Early Success Stories: OCBM in Action

In 2023, a mentoring programme was launched, inviting makerspaces to explore how to apply elements of the OCBM to achieve financial independence.

Ronald from iZone Hub in Zimbabwe shared that the mentoring programme was instrumental in his makerspace's journey towards sustainability.

"It was great how flexible the Open Business Model Catalogue was. We could adapt it to the needs of our makerspace. It was not made in stone, but an encouragement and provided new ideas to make small changes that fit in the current systems."

With guidance from mentors, the team explored alternative revenue streams, such as partnering with organisations to fund training initiatives and offering 3D printing services.

"In one of our sprints, we realised with the support of our mentor that we can try to partner with other organisations to come in and pay for the training. It opened our eyes."

Eric from Garoua Makerspace in Cameroon highlighted the value of exchanging experiences with other makerspaces and learning from diverse mentors.

"The best thing was the sharing of experience with other makerspaces from different areas. We started to collect experiences with offering trainings to be able to generate income. The population here is not so open to new technology, but curiosity is growing."

Michael Danquah from Design and Technology Institute in Ghana reports that the OCBM supported implementing more structured revenue-generating activities.

"It guided us in creating an online training model for 3D modeling, which helps us expand access to our offerings and attract a broader range of users... It has also helped us refine our approach to community engagement by offering new models like Startup Support."

Mary Nyamanga of FabLab Winam in Kenya explains how the OCBM helped to re-evaluate the current business model.

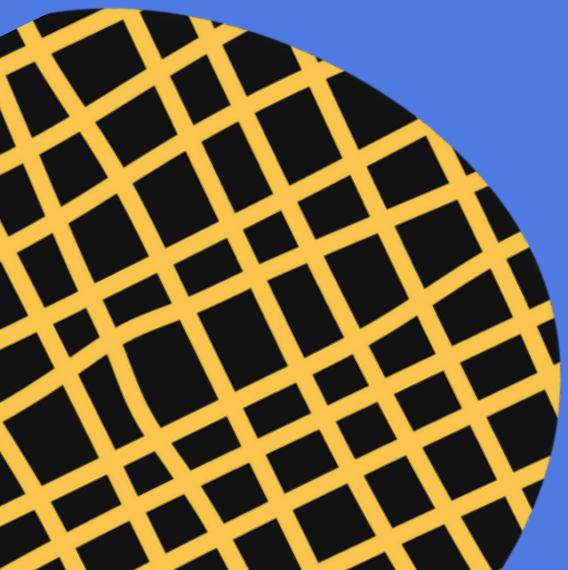
"The OCBM has resulted in re-evaluating our current business model. We are considering implementing complementary models, where we have come up with a price list for different packages, which will help in addressing scalability and financial sustainability."

Through mentorship, co-creation, and an adaptable toolkit, the OCBM can help to transform makerspaces into financially resilient, impactful hubs for innovation.

For further information visit
LocalEconomies.org or contact **anna@manufacturingchange.org**

02

The mAkE guide to venture building



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Makerspaces as Catalysts for Business Growth with the mAkE Venture Building Programme

As worldwide hubs of creativity and innovation, makerspaces have the potential of transforming into powerful venture builders, supporting entrepreneurs in developing sustainable, impactful businesses. To strengthen this shift, GreenTec Capital Africa Foundation, developed a **Venture Building Programme and Handbook for makerspaces, digital innovation hubs, startups and SMEs.**

A Comprehensive Venture Building Toolkit

The Venture Building Handbook serves as a practical guide for entrepreneurs, venture builders, and makerspace managers. It outlines 12 critical steps for launching and growing scalable businesses — from idea generation to market research, product development, and networking. This structured approach provides entrepreneurs with both the strategic and operational skills needed for sustainable growth.



"The Venture Building Handbook has given me knowledge about venture building which I never knew before. Most of our Fablab activities are much more on making and building, but with this knowledge, we can now take those innovations into business." – Fablab Manager from Tanzania

12 steps for Venture Builders

1. IdeaGenerationandValidation	7. Legal and Regulatory Compliance
2. MarketResearch	8. Sales and Marketing Strategies
3. BusinessModelDevelopment	9. Scaling and Growth
4. ProductDevelopment	10. Networking and Mentorship
5. TeamBuildingandLeadership	11. Exit Strategies
6. Fundraisingandfinancialmanagement	12. Case Studies and Real-World Examples

english

Access the the Venture Building Handbook in English and French:

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french

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Community Voices - Venture Building in Action

The handbook places a strong emphasis on user-centric design, a perspective that resonates deeply with entrepreneurs striving to address local needs and challenges.

"The focus on user-centric design was eye-opening. It emphasized understanding the customer journey deeply, inspiring me to conduct thorough customer feedback sessions and adjust our solutions accordingly." – Fablab Manager from Kenya

The handbook's emphasis on leveraging local resources has also sparked new insights.

"The handbook is enriched with insights that resonate with African businesses... leveraging our local resources, like talents, can be an easy and best way of not just generating but validating the feasibility of an idea." – Fablab Manager from Ghana

It provides makerspaces, entrepreneurs and startups with a frame for self-reflection, personal and corporate development.

"With this new knowledge, I intend to tailor support strategies for startups in makerspaces through 1-on-1 mentorship with founders, hub managers, and trainers. This approach will strengthen connections and foster an ecosystem where startups can access vital resources and collaborative opportunities for growth." – Trainer and Innovator from Tanzania

The handbook also serves as a testing ground for refining one's own business models before bringing these strategies to clients and community members.

"I liked the training content on Financial Analysis and Business Models best and will improve our current model of operations as a result of this knowledge." – Fablab Manager from Tanzania

"I will be my own test case first, fine-tuning the business model for my Hub. With that experience, I will then bring this approach to the organisations and businesses I mentor, coach, and train." – FabLab Manager from Ethiopia

A Path Forward for Makerspaces as Venture Builders

This pillar of the mAkE Venture Building Programme is supporting makerspaces to evolve into venture-building hubs that stimulate local economies and support sustainable business development. If you are interested, find more info on:

makeafricaeu.org

03

The mAkE train-the-trainer journey



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Empowering Maker Communities: The Open Makerspace Toolkit and Training-of-Trainers Program

The mAkE project's **Training-of-Trainers (ToT) program** shows how education and innovation can come together to transform communities. Through the **Open Makerspace Toolkit (OMT)**, the program has empowered local leaders in Ghana, Cameroon, and Côte d'Ivoire to create vibrant hubs of creativity and learning, fostering STEM education and sustainability.



The **Open Makerspace Toolkit** provides structured, actionable guidance on key areas such as makerspaces setup, communication strategies, and business model development.

The **Training-of-Trainers program** introduced participants in methodologies on how to train the usage of the Open Makerspace Toolkit in their local communities.

Access the Open Makerspace Toolkit it in English or French under:

https://pressbooks.pub/omt4make/

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A Ripple Effect of Change

The Open Makerspace Toolkit and Training-of-Trainers program's impact goes beyond individual sessions:

- **Adaptability:** The OMT's flexible design has enabled its integration into diverse contexts.
- **Sustainability:** By fostering collaboration and equipping participants with practical tools, the program has ensured that knowledge and resources are continuously shared.
- **Community-Led Growth:** From Ghana to Cameroon and Côte d'Ivoire, trained facilitators have taken ownership, creating a ripple effect of innovation.

Ghana: Transforming Education with STEM Lab

In July 2024, Kweku Efa-Ampomah, a passionate advocate for STEM education, led a **Train-the-Trainer workshop** at the AfricaOSH Summit in Accra. Equipped with skills and resources from the Open Makerspace Toolkit and inspired by the workshop, Kweku facilitated others to bring innovation to the classroom.



- Kweku trained over **50 teachers** from **12 public schools** across Ghana, equipping them to manage 12 newly established STEM laboratories in senior high schools.
- The Open Makerspace Toolkit's comprehensive resources and standardized best practices play a pivotal role in **ensuring the sustainability and inclusivity** of these labs.
- These labs provide students with hands-on experience in 3D printing, robotics, and digital fabrication, fostering ideation and problem-solving.

"The Open Makerspace Toolkit has been instrumental in guiding me through setting up and managing makerspaces effectively, particularly in designing sustainable business models that align with our community's needs," **Kweku Efa-Ampomah**

Cameroon: Sustaining Innovation in Makerspaces

The Mboalob, a prominent makerspace in Yaoundé in Cameroon, has shown how the ToT program and Open Makerspace Toolkit can become a cornerstone of training and empowering local makers. **Mboalab** has seamlessly integrated the OMT into its operations.

- The ToT methodology is now part of **quarterly workshops**, serving as a tool for onboarding new members and sustaining engagement.
- Resulting in an increased **member participation** and improved **project quality.**



"By integrating the ToT methodology into our training programs and utilizing the OMT as a comprehensive resource, we've observed a significant increase in member engagement, a deeper understanding of key concepts, and a noticeable improvement in the quality of projects developed," **Stephane Fadanka, Executive Director of Mboalab**

Following the inaugural training in May 2024, facilitators such as **Fabrice Tei Jouet** (Africa Robot) and **Mohammed Basirou** (Ongola Fablab) have extended the program, hosting events that promote collaboration and innovation within their networks. This shows how the ToT and OMT resources are adopted and applied in new contexts by training participants.

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Côte d'Ivoire: Balancing Mission and Sustainability

In Abidjan, Côte d'Ivoire, the ToT workshop held at HFabLab in April 2024 focused on leveraging makerspaces for socio-economic development.



- Participants explored innovative strategies to make makerspaces financially sustainable while remaining inclusive to the entire community.
- These discussions sparked new ideas on how makerspaces can balance their mission-driven goals with practical economic considerations.
- The workshop fostered collaboration among makers, innovators, and community leaders.

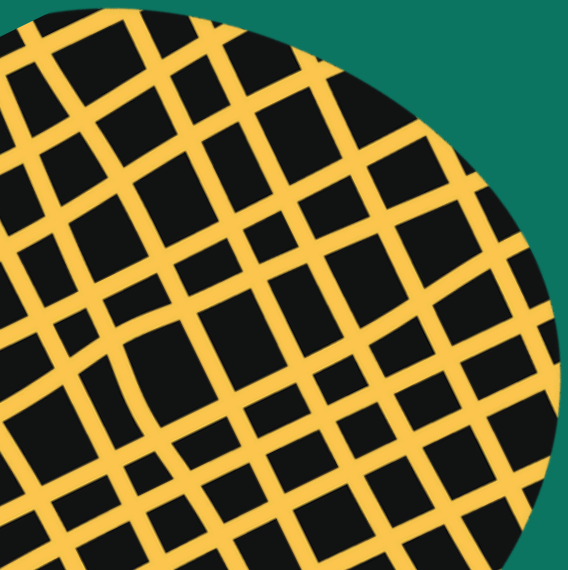
"This ToT was an exceptional opportunity to share knowledge and exchange ideas on developing the capacity of makerspaces, using the valuable training elements of the toolkit," **Dodji Honou, CEO of HFabLab**

For more information, please visit

makeafricaeu.org

04

Policy pathways for makerspaces



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Policy Recommendations for Makerspaces Gain Ground with Global Policymakers

"These policy recommendations have not only attracted the attention of local government representatives, makerspaces, founders and NGOs. They have also charted a clear way forward for makerspaces. Through ongoing workshops and dialogues, this living document serves as a tool to foster collaboration, innovation, and sustainable development within the local and global maker ecosystems."

--- Joseph Agyina, Internet of Production ---

In 2023, the mAkE project engaged with 69 stakeholders (26 from Africa, 43 from Europe), including makers, founders, educators, managers, and community members from diverse makerspaces, to co-create a set of **POLICY RECOMMENDATIONS**.

Throughout 2024, the policy recommendations have been presented to both policymakers and makerspaces at various events. Feedback from these engagements highlights the growing interest in implementing and expanding the recommendations.

"We engaged for one year with makers and stakeholders within the African and European ecosystems to gain insights into the barriers and enablers influencing their work and to explore how governments at various levels can recognise and support makerspaces."

--- Freda Yamorti Gbande, Fab City Foundation---



During the Ghana Hubs Network's general meeting 2023, the policy recommendations were presented to a diverse group of *stakeholders — including government representatives such as the Director of National Entrepreneurship and Innovation Programme (NEIP), a GIZ representative, the Dean of Languages at Takoradi Technical University (TTU), and others from the Ghana Association of Industry and the Ghana National Youth Employment Agency.*

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5 Policy Recommendations ...

01 Leverage the potential of makerspaces by collaborating on national projects that focus on capacity building for youth and entrepreneurs, while promoting locally made products.

02 Create funding initiatives to provide resources for makerspaces to implement research and innovation projects.

03 Endorse maker programs and courses, which are funded by the government and aimed at local communities.

04 Integrate makerspaces into school curricula, particularly focusing on Science, Technology, Engineering, Arts, and Mathematics (STEAM) education.

05 Recognize makerspaces as critical infrastructure for local manufacturing.

... and Community Voices

"Establishing government partnerships and collaborating on national projects could provide makerspaces with opportunities to contribute their expertise and resources toward addressing societal challenges, while also raising their profile and influence."

"Implementing dedicated funding programmes would allow makerspaces to enhance their capabilities, invest in critical equipment, and drive forward innovation projects."

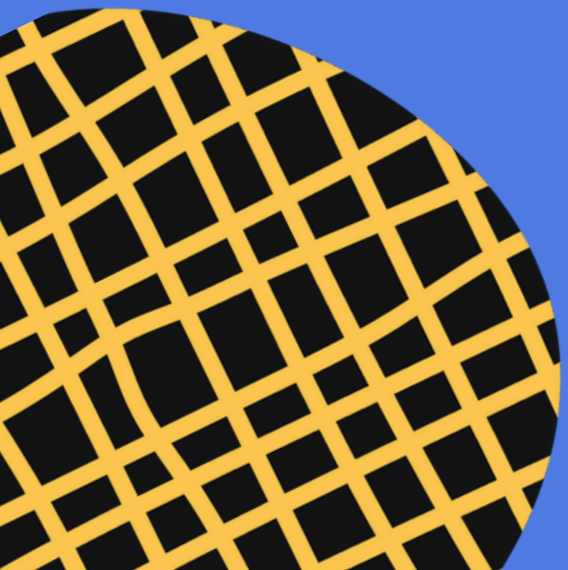
"Recommendations #3 and #4 regarding endorsing maker programs/courses and integrating makerspace activities into formal education curricula could significantly boost awareness, access, and sustainability for these facilities."

"From a global perspective it stimulates open source knowledge exchange and proliferation of technologies."

The recommendations, including more detailed explanations and good practice

05

Making change: the makers in residency



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The “Makers in Residency”-Programme Sparks Innovation and Collaboration between African and European Makers

The Makers in Residency (MiR) programme has successfully connected African and European makers, fostering a unique blend of knowledge sharing and collaborative innovation. In 2024, the MiR programme supported four emerging hardware innovators from Egypt, Tanzania, and Rwanda, providing a one-month residency in European makerspaces. Each maker worked on ground-breaking projects while benefiting from direct mentorship, access to advanced equipment, and an inspiring environment.

“This initiative aims to break down barriers, create new ideas, and build essential networks between continents.”
---- Fabienne Kirchhof, GreenTec Capital Africa Foundation ----



Martine, a maker from Rwanda hosted in Belgium, focused on a sustainable solution to reduce material costs for makers by recycling plastic bottles to create affordable 3D printer filament.

"The timeline was tight, but with the Liege team’s support, we combined our efforts to make it happen."

--- Martine Basaninyage, Westerwelle Startup Haus Fab Lab, Rwanda ---

Martine’s hosts witnessed her dedication and ingenuity,
"We learned so much from her resourcefulness and resilience — she’s building amazing solutions with far fewer resources than we’re used to.”
--- Loic, Hackerspace Liege, Belgium ---



Asem, a maker from Egypt hosted in France, brought a sense of international community to La Bricothèque Fablab, engaging with local members and sharing his project’s vision and knowledge. *“Asem’s openness to share his work and life experiences made our Fablab feel part of a global network. We saw a natural exchange of ideas and cultural understanding”*
--- Olivier, La Bricothèque, France ---

“My impression about this program is positive and eye opening, as someone who has never been to Europe it was amazing seeing such cool places like the textile lab”.
--- Asem Kamal, maker and content creator, Egypt ---

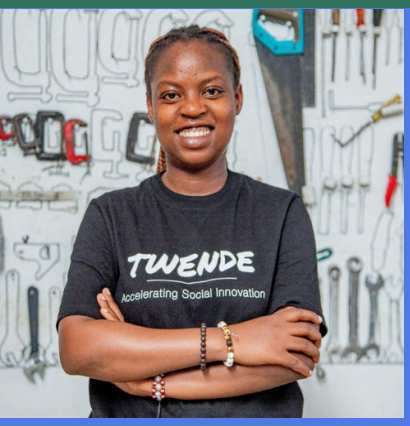
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Meanwhile, Leonard, a maker from Tanzania hosted in Spain, pursued his vision to build a nano-satellite prototype to inspire African students and makers in STEM. During his residency at Fablab Barcelona, Leonard expanded his network and honed his technical skills with new equipment.

"This programme brought me closer to new knowledge, and I had hands-on experience with different machines that sparked ideas on how I can bring similar technology to Tanzania,"
--- Leonard Shayo, founder of the aerospace startup Olspace ---

His host, Santi from Fablab Barcelona, was equally inspired, noting Leonard's unstoppable drive: *"He came in saying, 'I have to learn as much as I can; I want to send a rocket to the moon!' His determination was infectious."*
--- Santi, Fablab Barcelona ---



Witness, a Tanzanian maker hosted in France, reflected on how the residency inspired her project management approach and technical work.
"I have been impressed by the makerspace, the organization, the workshops and overall management. This creates a truly inspiring environment for anyone to get creative."
--- Witness Shingali, Twende Social Innovation Center, Tanzania ---

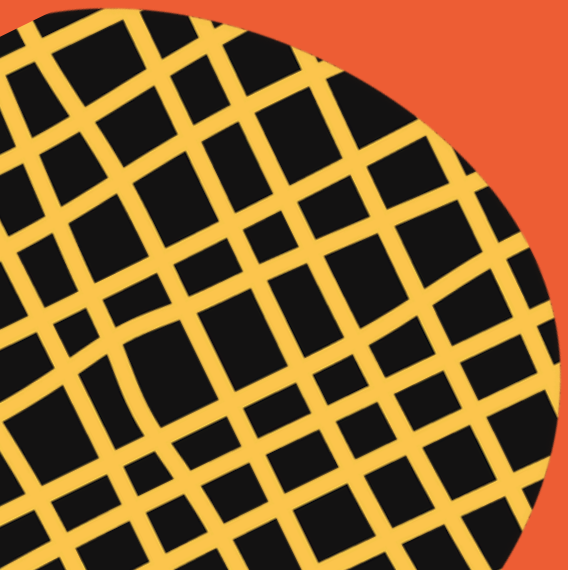
Although she felt that one month was limited for a complex prototype, Witness returned to Tanzania with a strong foundation, sketches, and collaborative documentation to drive her project forward. This residency programme has not only equipped African makers with new tools and skills but also brought fresh perspectives and cultural insights to the European hosts.
"We documented everything to support Witness's ongoing work in Tanzania. The collaboration doesn't end here; we'll stay connected to help her team scale up."
--- Matthieu, Ecocentre, France ---

"Through these transformative exchanges, the MiR programme has strengthened a global network of makers committed to using their skills to address real-world challenges, demonstrating the powerful impact of cross-continental collaboration in the maker community." --- Kirstin Wiedow, Global Innovation Gathering ---

Further information on https://makeafricaeu.org

06

The rise of distributed manufacturing



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Distributed manufacturing - makers get ready to participate in production!

Supporting localised and distributed manufacturing via new technologies enables makerspaces to fill critical gaps in local markets on a commercial basis. Shorter supply chains and lower shipping costs can make local manufacturing competitive and bring business opportunities for makers, makerspaces and their local manufacturing networks. With this vision the mAkE project worked on innovative distributed manufacturing infrastructures that support sharing skills, machinery and contracts thus facilitating the contracting process with many manufacturers .

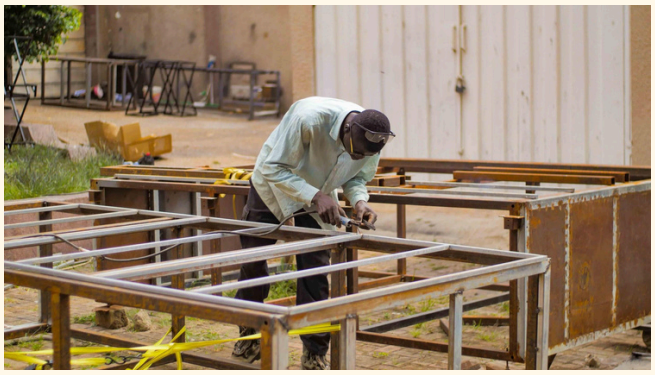
Distributed manufacturing trials with two makerspaces

To test the innovative infrastructures developed in mAkE and collect feedback on its usefulness and applicability, **two makerspaces from Ghana and Kenya were involved in a trial** where they used the maker passport prototype, map of machinery and contracting model. As part of the trial, the makerspaces registered their machines on the map of machinery, individual makers signed up to the maker passport and were contracted to produce a series of distributed manufacturing items. Both makerspaces saw this trial as an opportunity to attract new members eager to learn new skills. They took the initiative to organize 3D printing training sessions before the trial, preparing new members for their participation and encouraging individuals to engage and grow within the community. Here is the feedback from Michael and Derrick, two managers of makerspaces in Ghana and Kenya, from their participation in training and trials:

Michael, Triple Dimension, Ghana

Metal fabricators are at the heart of Michael's makerspace's growing community. Traditionally working in their own spaces, these artisans began visiting the makerspace to tackle more complex, technology-driven tasks. For many, the trials and associated training introduced them to tools like laser cutting and 3D printing—technologies that opened up new creative possibilities and fostered opportunities for collaboration. The trials, which were conducted in 2023, were a significant success. Triple Dimension's setup of diverse machines across multiple locations allowed makers to explore advanced techniques and solutions. The experience led to a major milestone: securing their own

rented space, which not only offered a dedicated workshop but also enabled Triple Dimension to expand their impact by teaching in Kumasi. The response from participating makers was overwhelmingly positive. Many expressed a strong interest in engaging in future projects, eager to continue learning and leveraging the makerspace's resources. A key insight from the trials was the collaborative spirit among makers. The process of generating costs proved straightforward, with artisans working together to develop estimates and share ideas—a testament to the community's growing synergy. Building on this momentum, Triple Dimension recently took a major step by registering an association of metal workers. This initiative aims to deepen collaboration within the metalworking community. They are now engaging in discussions on how to leverage their collective skills and resources for future projects, further strengthening the network of makers. By introducing cutting-edge tools, fostering collaboration, and creating a space for growth, Triple Dimension is empowering metal fabricators to innovate, learn, and expand their creative horizons.



Picture: Metal worker, Kisumu, Ghana - photo credit: Triple Dimension (2023)

Derrick, IOME 254, Kenya

The trial provided a unique opportunity for makers and innovators of I.O.Me 254 to harness their skills and resources in a meaningful way. Designed to engage youth, the trials emphasized how hands-on training can be monetized by distributed manufacturing, motivating participants to see a direct and tangible outcome from their efforts. By equipping young people with practical skills, the program offered a promising alternative to quicker but less sustainable jobs, like motorcycle work. Recognizing the challenges of maintaining youth engagement, the program focused on quick skill acquisition and visible results to keep participants motivated and focused. A significant highlight of the initiative was its contribution to special needs education.

Writing aids were produced in the trials and donated to special needs schools, marking the beginning of a long-term partnership aimed at creating useful tools for pupils. The team was also invited to a Rotary Club event supporting children with cerebral deficiencies.

Faced with the need to produce more writing aids quickly, they efficiently scaled production and successfully delivered the tools.

The writing aid has become a signature product that the makers are committed to improving. By actively seeking user feedback, they aim to enhance the design and functionality to better meet the needs of students and teachers. The trials not only empowered youth with practical skills and entrepreneurial opportunities but also fostered social impact by addressing the needs of vulnerable communities. Through collaboration, innovation, and a focus on quality, the initiative continues to create positive change, inspiring young makers to build a sustainable and impactful future.



Picture: Girl manipulating a 3D printer, Lamu, Kenya - Photo credit IOME254 (2023)

Quote from Derrick on the Maker Passport:

The sign up form was easy to fill. Being able to map out makers with various skills is very useful at times when one is looking for specific skills within a certain location. And IOMe being makerspace in humanitarian context the people and skills will be useful to identify and reach out to makers when in need of solving humanitarian challenges and emergencies. For instance, if we are looking to host a makerthone, we contact the right people since we can be able to access them.

For more information on the distributed manufacturing infrastructure, please access:

- https://www.internetofproduction.org/innovative-manufacturing-in-africa
- https://community.internetofproduction.org/t/ima-distributed-manufacturing-trials/447/25



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