

Enhancing eCooking Appliance Repair via an Aggregator Platform in Tanzania.

Final Project Report

FIXCHAP COMPANY LTD



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For: FCDO and Loughborough University

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Executive Summary

Through the Modern Energy Cooking Services Programme, FixChap was contracted a subproject to enhance eCooking Appliance repairs via an Aggregator Platform. This aims to enhance the repair and maintenance services for eCooking devices, promoting broader adoption and sustainability of these technologies.

FixChap was a mobile platform where users could access home repair services such as electrical maintenance, plumbing and Air conditioning, where the App would connect them to the nearest available technician. This project aimed at integrating eCooking repair services on the existing mobile App and setting up additional platforms where users can access these services, such as the WhatsApp chatbot and customer service line.

The project involved developing a business model to work with eCooking device distributors, developing a platform to manage offline users, integrating eCooking services into existing mobile apps, and launching a WhatsApp chatbot for customer support. FixChap also hired a dedicated customer service team, created educational content, and ensured ongoing platform support to provide reliable service to users.

Key achievements include:

- **Platform Development**: A portal to manage offline user requests and integrating 4 eCooking appliances into the existing mobile apps. This will allow users to request and track eCooking repair services, even for offline users in areas with limited internet access.
- **Security**: Robust security measures to protect user data.
- **Customer Support**: Integration of a WhatsApp chatbot and a dedicated support team to handle inquiries and resolve issues efficiently.
- **Educational Content**: Videos to educate users on eCooking device maintenance and troubleshooting.

The project involved engagement with stakeholders particularly distributors to research on the best ways to design a repair aggregator system. From these engagements we had the following learnings which include the shortage of competent technicians to repair eCooking devices which leads to it being very expensive for eCooking distributors to manage warranty servicing due to shortage of skilled technicians hence devices have to be transported to a central location.

To scale the initiative, we recommend expanding provision of eCooking repair services through training of technicians on eCooking devices which will then lower warranty servicing costs to distributors and allow them to offer extended warranties which eventually builds more confidence and trust to consumers. We recommend building local distribution and repair networks and encouraging government support through policies and subsidies. This intervention will significantly contribute to increasing accessibility, building consumer confidence, and supporting market growth for eCooking solutions in Tanzania.

The project's success offers valuable insights for other East African countries, and with further development and partnerships, the initiative can scale to meet the growing demand for sustainable cooking solutions.

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1. Introduction

1.1 Background

The advancement of eCooking (electric cooking) in Tanzania is part of the broader effort to improve energy access, promote clean cooking, and reduce reliance on traditional biomass fuels such as firewood and charcoal. With a growing population and an increasing need for sustainable cooking solutions, eCooking technologies are emerging as a cleaner and more efficient alternative. There have been initiatives to address the key challenges to adoption of eCooking such as electricity access, high upfront costs, and consumer awareness but there has been little to no efforts on another important segment: repair services of eCooking devices. This has resulted in low consumer confidence, high costs for distributors to service the warranties which ultimately hinders the growth of this sector.

FixChap was launched in 2018 offering repair and maintenance services via mobile Apps. Users could request on the App and our unique matching algorithm would connect them to the nearest registered technician. We offered home repair services such as electrical maintenance, plumbing and Air conditioning. On this project the mobile Apps are adapted by adding repair services of 4 eCooking appliances and setting up additional platforms such as the customer service line and WhatsApp chatbot which expand the service access to even offline and less tech savvy users. This initiative aims to develop an aggregator platform to enable repair and access to qualified technicians a new nationwide network. The aggregator will assist the customer in finding suitable suppliers and repair services. The project will include a roll out of digital tools, development of an aggregator platform and customer engagement strategies, to enable FixChap to ensure high standards of service, increase the lifespan of eCooking devices, and improve user satisfaction while supporting MECS' objectives to promote sustainable cooking solutions.

1.2 Project Purpose

The primary purpose of this project is to bring together a range of service and supplier providers who are capable of efficiently servicing eCooking appliances. This network will help to minimize e-waste by extending life span on these devices, enhance the reliability of eCooking technology, and ensure that users receive the support they need to embrace these modern cooking solutions fully.

1.3 Project Goals

To achieve the establishment of an aggregator network of repair services of eCooking devices, the following were the specific project goals:

1.3.1 Technology adaption and extension for accessibility and connection:

Adapting the existing platform to include the eCooking service offering, we planned to redevelop the app to serve as a platform for connecting eCooking appliance users with trained technicians. This included a roll out of chatbot for social and messaging apps i.e., WhatsApp chatbot, and a dedicated call centre. These additional platforms were deemed important because it was seen that WhatsApp had a huge penetration and users were already conversant with it and for the call centre it would allow us to serve even the offline users. These digital tools will facilitate easy access to repair services, ensuring that customers can find reliable support within their local area.

1.3.2 Service Implementation:

- Dedicated Repair Service: Launch an eCooking appliance repair service via the FixChap app, chatbot and call center initially available in major cities as per stakeholder guidance. The current FixChap technicians (after they go through the planned eCooking repair training) will provide this service together with the newly trained ones; they will be onboarded to this aggregator network according to the agreed number on each city.
- Warranty Integration: Facilitate easy registration of eCooking appliances through a dedicated link, allowing seamless warranty claim processing.
- Standardized Service Rates: Coordinate with suppliers to ensure that services under warranty are provided at pre-agreed rates.

1.3.3 Customer Interaction and Support:

- -Digital Customer Support: Roll out a WhatsApp chatbot and a call center to provide efficient, user-friendly customer support and service booking.
- -Educational Content: Produce and distribute informative DIY content on appliance usage and maintenance on the website and chatbot to customers and users of eCooking appliances. The DIY will include two aspects: one is on key considerations on operating/using an eCooker and second is on common eCooker problems and potential solutions.

2. Project Implementation

The implementation of the project followed the order of the set deliverables and were achieved on the set time. Below the way each deliverable was implemented is described.

2.1 Platform Development and Service Activation

This involved the development of business model, technology and roll out of new and existing platforms to enable users to access eCooking services swiftly. This involved the following:

2.1.1 Structuring of eCooking warranty servicing model

Scoping was done by first analysing the existing warranty servicing models from established brands such as Hisense Electronics, Samsung and LG.

The next process was meetings with stakeholder's particularly E-cooking appliance sellers/distributors. Our aim was to first validate the need and to design a working warranty servicing model. We managed to meet 4 suppliers namely, SESCOM, UPENERGY, SMARTPIKA and POSITIVE COOKER. The inputs gathered from the two processes were analysed and we formulated an initial working model for warranty servicing as seen below:

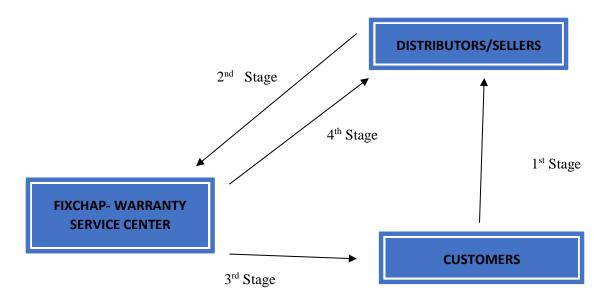


Fig 1: Warranty servicing model flow

1st Stage: Involves the reporting of repair issue, where the line of communication remains between the distributor and customer, this is where the warranty validity is checked and pre assessment is done by the distributors team.

2nd Stage: This is when the distributor relays a warranty issue to us after initial checks, and we get in touch with the customer for pick up or drop off the device to our center for technical assessment. The results of the technical assessment are relayed to the distributor for approval.

3rd Stage: On this stage; upon distributors approval the repair is done under warranty or on cash basis (if it was not eligible for warranty) and the fixed appliance is handed back to the customer.

4th Stage: This is the final stage where all the approved serviced warranty jobs are invoiced to the distributor for payment settlement.

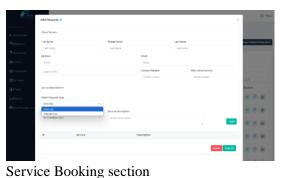
2.1.2 Development of eCooking Service Management Portal

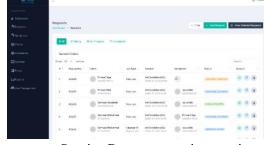
The service management portal was developed to enable our customer service team to manage offline service requests and processing warranty servicing engagement with eCooking distributors. It is an internal system that links to our core system where the customer service team will input details of customers who will prefer to access services by calling our service desk. Below are some snapshots to show how this portal looks like.



Log In page







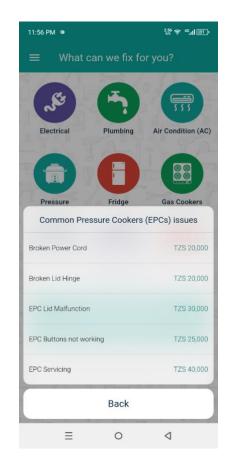
Service Requests preview section

Fig 2: Preview of the Service Management Portal

2.1.3 Development of iOS and Android Apps

The existing mobile Apps were modified to integrate the new service offering of eCooking repair and maintenance. This includes the UI/UX, the API and database. They were all modified to accommodate the new services process flow. Below are some of the snapshots of the new mobile app interface:





Mobile App Homepage

Mobile App EPC Service section

Fig 3: Preview of the updated FixChap Mobile App

2.1.4 Back End System Set Up

The back-end system setup involved configuring the development environment with necessary tools and libraries. The Database design updates included the creation or modification of schemas for efficient data storage. The API integrations were made to connect the back end with external services or the front-end, thus ensuring smooth data flow. During testing and iteration, unit, integration, and performance tests were conducted to identify and fix bugs, while maintaining code quality through CI/CD pipelines. Finally, the deployment set up of the production environment, configuring servers, load balancers, and monitoring tools ensured the system will run smoothly and efficiently for end-users.

2.1.5 Security and Compliance

The security and compliance process started by defining the scope and objectives to meet regulatory requirements. System architecture was audited to ensure it aligns with security best practices and compliance standards. Vulnerability checks and assessments were done to identify security risks like data breaches or coding flaws. A risk assessment evaluated the potential impact on operations and legal obligations. Finally, mitigation measures were tracked and implemented to address vulnerabilities, ensuring ongoing security and compliance with industry regulations, including encryption, access controls, and regular audits.

2.1.6 Communication Tools Set Up & Operations

This involved establishing effective communication channels which will allow users to easily access eCooking services. This included the following:

2.1.6.1 WhatsApp Chat-Bot set up and roll out

The process began by defining the chatbot's objectives, such as customer support or sales, and identifying the target audience. The next step was designing the chatbot's conversation flow, considering user interactions, predefined responses, and possible handoffs to human agents. After the design, we developed the chatbot using programming languages like Python or Node.js, integrating AI and NLP tools like Dialog flow for enhanced conversational abilities.

Testing: we checked if the chatbot responds correctly to common and edge-case scenarios. After completion, we then deployed the Bot via a WhatsApp number: +255 746 770 063.

After deployment, we keep monitoring the chatbot's performance, track user feedback, and continuously improve its functionality by making necessary adjustments based on real-world interactions. This iterative approach will ensure that the chatbot remains efficient, effective, and aligned with our user's needs.

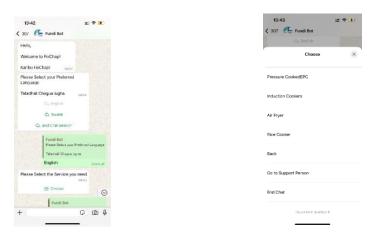


Fig 4: Preview of WhatsApp ChatBot conversation session

2.1.6.2 Customer Service Team Roll out

A customer service team of three people is crucial for managing offline customers particularly for the eCooking service line, this is how the service line will work:

A customer can call our dedicate service line which is 0712-770011, and they will get assistance for the following issues:

- 1. The basic knowledge of eCooking devices particularly the basic/common issues.
- 2. The service team will be responsible for handling customer requests; including lodging customer data into the service management portal and ensuring service is completed.
- 3. The service team will also be available to assist customers in case of any questions on how to use eCooking devices.

Workflow and Escalation Process:

First step: Initial Point of Contact

The Customer Support Representative (CSR) will be the first point of contact when customers call the service line. They will gather essential information such as: Customer's name, contact information, and the device in need of repair and input it into the service management portal. CSR will provide immediate troubleshooting steps if applicable and advise the customer on how to proceed. If the issue cannot be resolved quickly the CSR will move to the next step.

Second step: Technical Assistance and Diagnosis

The Customer Support Representative (CSR) will offer detailed instructions on how to operate, clean, or reset the eCooking device to troubleshoot. CSR will also provide guidance on warranty coverage and repair cost estimates (if available). If the device needs professional repair, CSR will proceed to the next step.

Repair Scheduling and Follow-Up

The Customer Support Representative (CSR) will handle scheduling of the repair service through the service management portal, ensuring the repair technician visits the customer or the device is brought to the service center (depending on whether it is under warranty or not).

Additionally, CSR will follow up with the customer after the repair service to ensure satisfaction and gather feedback.

2.2 Content Creation

We did a series of consultations with eCooking appliance sellers/distributors and final users, and we were able to note the key knowledge gaps. We then focused on educational content creation, producing videos to educate users on two aspects; one is on how to properly use and maintain eCooking devices and second is key considerations on using the eCooking device. We covered 4 devices namely: Electric Pressure Cookers, Induction Stoves, Air fryers and Rice cookers, please find the video links below:

Electric Pressure Cooker

Induction Stove

Air Fryers

Rice Cookers

These videos will be integrated to the WhatsApp Chat-Bot where users can learn about each device. We will also share them on our social media platform. This will enable users to easily understand the functionalities of their eCooking devices and how to troubleshoot minor issues on their own.

2.3 Ongoing Platform Support

Ongoing platform support is critical to ensure consistent performance and user satisfaction. Hosting and server yearly costs cover the infrastructure required for the platform's operation, ensuring scalability, reliability, and security. These costs are necessary to maintain smooth access and avoid downtimes. WhatsApp Chatbot API yearly fees enable the platform to integrate and maintain chatbot services that facilitate communication with users. These fees support updates, continuous operation, and ensure seamless interactions. Technical support and scheduled routine system maintenance are essential for addressing technical issues, optimizing platform performance, and ensuring security. Routine maintenance helps prevent disruptions by patching vulnerabilities, while technical support ensures that problems are resolved quickly. Together, these components are vital for sustaining a reliable, efficient, and secure platform that meets user expectations and remains operational. The project will support the platform maintenance costs for the first two years, after which the company will be on the position to cover them sustainably from its operations.

3. Lessons Learned

Implementing this project has been a challenging yet rewarding experience, offering numerous opportunities for learning and improvement. Throughout the process, several key insights have emerged, shedding light on both the technical and customer service aspects of managing eCooking devices. These lessons are valuable for the eCooking sector as well as enhancing the overall efficiency of the service, improving customer satisfaction, and ensuring the long-term success of the project. They may also be insightful for repair projects in other contexts, although discernment is required to transfer them to other country contexts.

3.1 Knowledge level on eCooking devices:

The stakeholder interviews with suppliers and distributers showed that low user knowledge on how to properly use an eCooking device significantly contributes to an increase in repair cases and device breakdowns. When users are unfamiliar with the correct operation, maintenance, or safety protocols of the device, they are more likely to misuse it, leading to damage. For example, improper handling of temperature settings, incorrect cookware usage with induction cookers, or failure to clean the device regularly can all result in wear and tear, malfunction, or overheating. The knowledge gap is also existent on the side of technicians, as distributors struggle to get competent technicians to fix the eCooking devices and it ends up being very costly to service the warranties.

Educating both users and technicians on the correct operation, maintenance, and troubleshooting techniques for eCooking devices can reduce these issues, improve device longevity, and decrease repair cases.

3.2 eCooking device electrical compatibility:

Lack of eCooking device electrical compatibility with local electrical specification significantly contributes to the breakdown of these devices. In Tanzania, electrical systems vary in terms of voltage, frequency, or plug types compared to international standards.

In Tanzania, electrical systems differ from international standards in terms of voltage, frequency, and plug types, which can cause problems for eCooking devices. Here's how:

Voltage Differences:

Tanzania's standard voltage is 230V, similar to many European countries, but some international devices come designed for 110V (common in North America).

Problem: If you plug a 110V device into a 230V outlet, it will overload and damage the device, potentially causing it to burn out or fail.

Frequency Differences:

Tanzania operates at 50Hz frequency, which is typical for most countries. However, some countries (like the U.S.) use 60Hz.

Problem: Devices built for 60Hz may not work properly or could overheat when used in a 50Hz system. This causes some parts to wear out more quickly or stop working.

Plug Types:

Tanzania uses Type G plugs, but many countries use different plug types (e.g., Type A, Type B).

Problem: If the plug type doesn't match the socket, the device can't be plugged in, requiring a converter or adapter. This could cause issues if the adapter doesn't support the correct voltage or frequency, leading to device damage.

In summary, using devices in Tanzania that aren't compatible with local voltage, frequency, or plug types cause them to overheat, burn out, or break down prematurely.

This mismatch causes frequent breakdowns, increase repair cases, and reduce the overall lifespan of the devices, highlighting the importance of ensuring that eCooking appliances are compatible with local electrical infrastructure before distribution. Since MECS is already working with TBS on establishing the Minimum Energy Performance Standards (MEPS), this aspect should be taken into account on establishing standard requirements for eCooking appliances.

3.3 Standard Quality Checking of eCooking devices:

Lack of standard quality checking for eCooking devices before they enter the Tanzania market leads to an increase in device breakdowns. Without stringent quality control measures, devices may be produced with subpar materials or components that fail prematurely. For instance, when engaging with local fundis we learnt that devices come with faulty wiring, inadequate insulation, or poor manufacturing practices which lead to electrical malfunctions and overheating. Additionally, devices may not meet essential safety and durability standards, making them more prone to wear and tear. This lack of quality assurance results in higher repair

cases, customer dissatisfaction, and a decrease in the overall reliability of eCooking appliances in the market. Implementing rigorous quality checks ensures that only safe, durable, and reliable devices reach consumers, helping to reduce breakdowns and improve user experience. While the development of Minimum Energy Performance Standards (MEPS) will likely help with this, the sector also needs to specifically examine and control for durability as a product attribute.

3.4 Geographic Coverage and Accessibility

Most distributors of eCooking devices lack strong distribution channels and most of their services are centralized in the urban areas. Urban areas have more readily available repair services, but upcountry regions face challenges due to fewer technicians and long distances to service centres. Geographic coverage and accessibility are crucial when developing an aggregator network of repair technicians for eCooking devices. To address this, the network should strategically place technicians in key regions, ensuring that even remote areas are covered. This will involve establishing repair centres to serve as repair hubs. Providing accessible repair services ensures customer satisfaction, builds brand loyalty, and helps eCooking adoption grow across all regions, regardless of their proximity to major urban centres.

3.5 Sustainability and Scaling

Sustainability relies on ensuring a steady supply of spare parts through building relationships with manufacturers and suppliers. Technicians must be trained not only to repair devices but also to handle a variety of issues, ensuring high-quality service across the network.

To scale, the network should focus on increasing the number of trained technicians in both urban and rural areas, expanding geographic coverage. Leveraging technology, such as a mobile app and WhatsApp chatbot, can streamline work performance and facilitate communication to allow users to access services swiftly.

4. Further Discussion

4.1 What the Intervention Means for the Sector

The initiative to build an aggregator network for eCooking repair services is a significant intervention in Tanzania's eCooking sector. By creating a reliable, accessible repair network, it addresses one of the key barriers to widespread adoption of eCooking technologies—concerns about maintenance and repairs. For many consumers, especially in rural areas, the availability of skilled technicians and spare parts has been a major challenge, often preventing them from fully embracing eCooking devices.

This intervention will lead to 3 outcomes that support sector growth, as follows:

- 1. First, it will build consumer confidence in eCooking devices, knowing that repair services are easily accessible. As a result, people are more likely to invest in eCooking technologies, which could lead to an increase in their adoption across households.
- 2. Secondly, the aggregator network will help create job opportunities for local technicians, boosting the local economy and enhancing skills development in the service sector.
- 3. It will lower repair costs for distributors which will allow them to have steady margins and grow their market.

By ensuring that repairs are affordable, efficient, and available across the country, this initiative will contribute to the sustainability of eCooking devices, making them more reliable and long-lasting. In turn, this will accelerate the transition to eCooking technologies, supporting Tanzania's broader goals of reducing reliance on traditional fuels and promoting sustainable energy solutions.

4.2 Areas for Further Development to Support the eCooking Sector in Tanzania

To further support the eCooking sector in Tanzania, the following key areas of development are needed:

Consumer Education and Awareness: There is a need for comprehensive educational campaigns to inform consumers about the benefits, proper usage, and maintenance of eCooking devices. This would help reduce misuse, extend device lifespan, and increase consumer confidence in adopting eCooking technology. MECS programming includes a National eCooking Awareness Raising Campaign, endorsed by the Ministry of Energy, and this should include information on proper usage and maintenance of eCooking appliances. Other awareness campaigns should also ensure they address this issue.

Affordable Financing and Subsidies: Many households may find the upfront cost of eCooking devices a barrier. Introducing affordable financing options, subsidies, or partnerships with microfinance institutions could make these devices more accessible, especially for low-income communities.

Local Manufacturing and Spare Parts Supply: Developing local manufacturing capabilities for eCooking devices and their spare parts would help lower costs, ensure better availability, and reduce dependency on imports. This would also stimulate local job creation and economic growth.

Energy Access Expansion: Expanding electricity access to rural and off-grid areas is crucial for the success of eCooking devices. The Mwalimu Nyerere Dam has been a breakthrough, but questions remain on the distribution of electricity. TANESCO are dealing with old infrastructure which causes mishaps in the availability of power.

Regulatory Frameworks and Standards: Establishing clear regulations and quality standards for eCooking devices will ensure that only safe, efficient, and durable products are available in the market, improving user satisfaction and reducing device breakdowns. While MECS programming contains the development of Minimum Energy Performance Standards (MEPS), durability should also be looked to support this area further.

Repair and Maintenance Knowledge: Expanding repair services through training technicians by integrating the eCooking devices repair training into the existing TVETs curriculum. The second part of the MECS programming in Tanzania about repair and maintenance addresses

this, through developing a curriculum for training technicians. This will then be integrated into existing TVET curricula.

Data Collection and Monitoring: Collecting data on eCooking adoption, device performance, and user behaviour will allow stakeholders to track progress, identify challenges, and continuously improve services, ensuring that the sector evolves to meet the needs of consumers.

These areas of development will not only improve the adoption of eCooking in Tanzania but also support long-term sustainability, affordability, and accessibility for consumers across the country.

5. Conclusions

In conclusion, the development of an eCooking repair aggregator network in Tanzania represents a pivotal step toward ensuring the widespread adoption and sustainability of eCooking technologies. By addressing critical barriers such as access to reliable repair services, technician training, and the availability of spare parts, the aggregator network provides consumers with the confidence to embrace eCooking devices without the fear of potential breakdowns or high maintenance costs. This initiative has the potential to significantly enhance the eCooking sector, contributing to cleaner, more efficient cooking practices across the country.

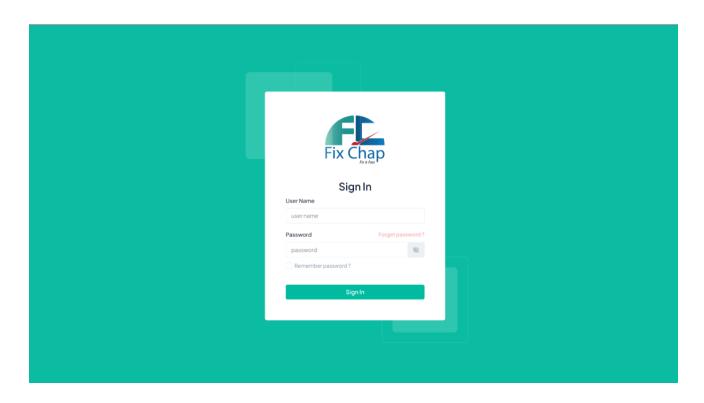
Through strategic partnerships with eCooking devices distributors with an emphasis on accessibility, Fix Chap's repair aggregator model can foster long-term growth in the sector, create economic opportunities, and support the transition toward sustainable energy solutions. Furthermore, the development of repair infrastructure can help build a resilient ecosystem around eCooking, ensuring its adoption is not only viable but also scalable in both urban and rural areas.

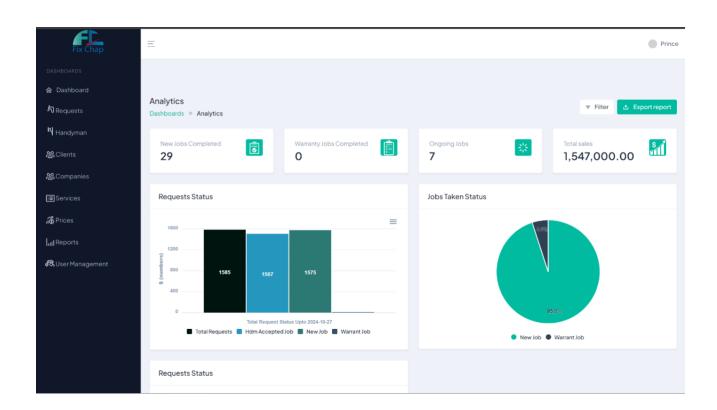
As the network expands, continuous investment in consumer education, training, and local manufacturing will be essential to maximizing the benefits of eCooking, improving livelihoods, and promoting environmental sustainability. Ultimately, this repair aggregator network will play a key role in accelerating Tanzania's shift towards a cleaner, more sustainable cooking future.

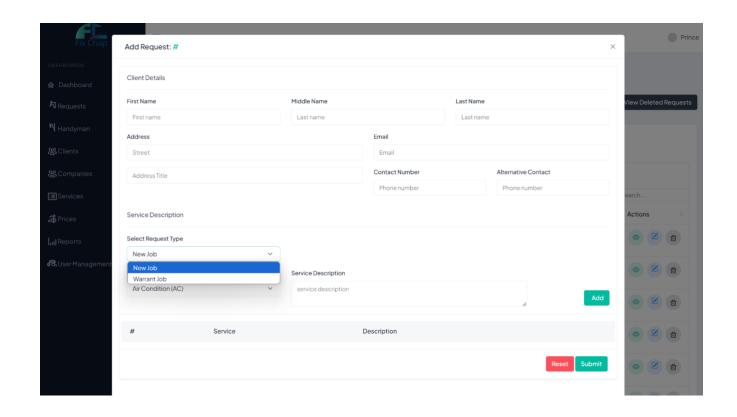
MECS is on the right track in supporting Tanzania's eCooking transition. By addressing key areas like awareness, affordability, technician training, and quality standards, their comprehensive approach ensures the success and sustainability of eCooking in the country. Collaborating with local partners and leveraging government initiatives further strengthens the programme, creating a solid foundation for long-term growth and adoption of clean cooking solutions in Tanzania.

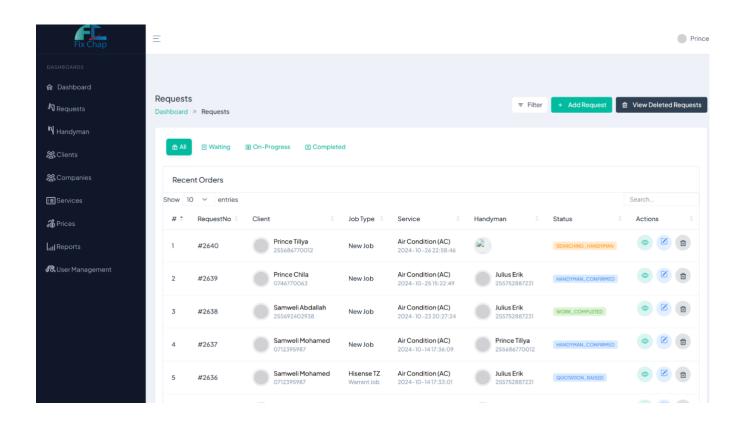
6. Appendices

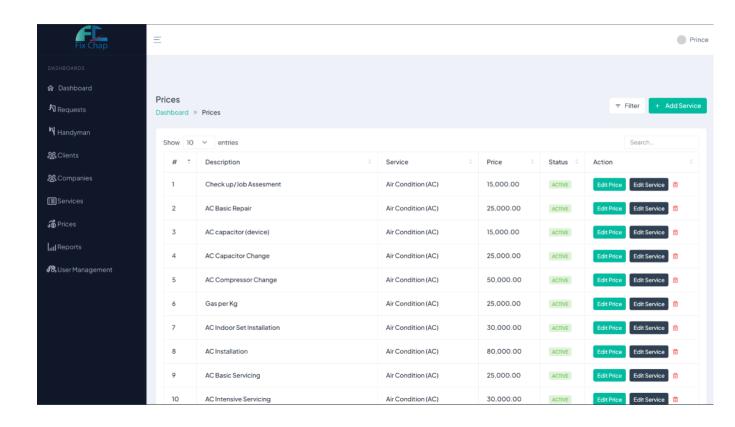
Appendix 1: Service Management Portal Screenshots

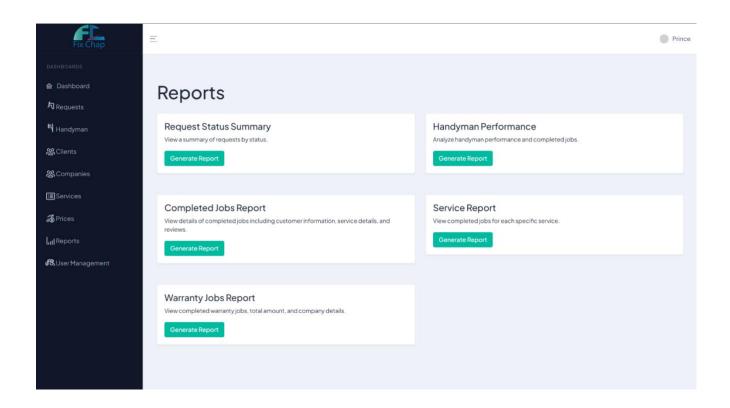








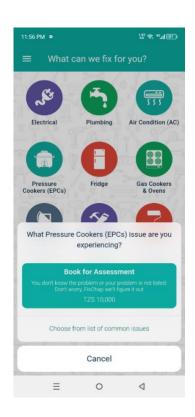




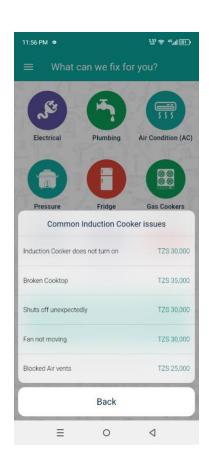
Appendix 2: Updated FixChap Mobile App screenshots

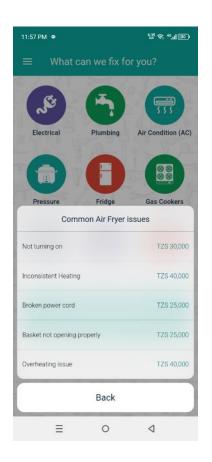




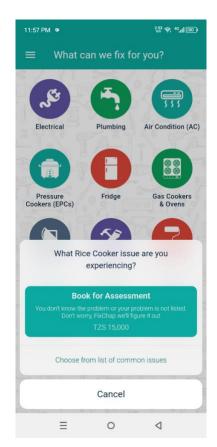


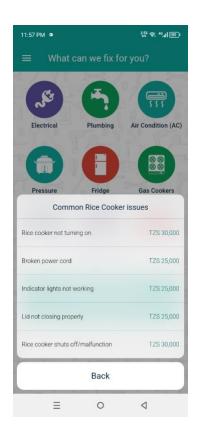


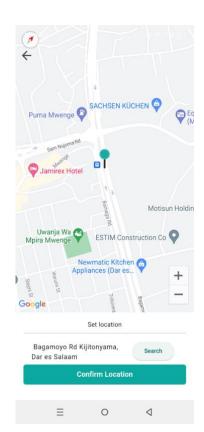


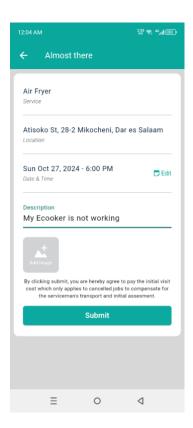












Appendix 3: WhatsApp ChatBot Flow and Session Screenshots

