

Impact Assessment Report

CSR CONTRIBUTION TO

TECHNOLOGY BUSINESS INCUBATOR

Honeywell Hometown Solutions India Foundation (HHSIF)

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 **Goodera**
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CONTENTS

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION AND PROJECT BACKGROUND	5
3. OBJECTIVE AND SCOPE OF STUDY	6
4. METHODOLOGY	7
5. ANALYSIS AND FINDINGS.....	9
5.1 Start-up: SIAMAF Healthcare Pvt Ltd.....	9
5.2 Start-up: Path Shodh	12
5.3 Start-up: Theranautilus	14
5.4 Start-up: HealthSeq	16
5.5 Start-up: Equine Biotech	19
5.6 Start-up: Azooka Labs	21
5.7 Start-up: Protein Design.....	24
5.8 Start-up: MIMYK	25
5.9 SID's Support to Startups.....	28
5.10. Overall Fund Utilization	30
6. CONCLUSION.....	32
7.RECOMMENDATIONS.....	34
8.ANNEXURE.....	35

1. EXECUTIVE SUMMARY

The **Society for Innovation and Development (SID)** was founded in the year 1991, in close collaboration with the Indian **Institute of Science (IISc)** Bangalore. The mission of SID is to enable Innovations in science and technology by creating a purposeful and effective channel to help and assist industries and business establishments to compete and prosper in the face of global competition, turbulent market conditions, and fast-moving technologies.

As a part of this mission, SID provides start-ups with space, a small amount of seed funding, access to IP, labs and tools in the Institute, technical and business mentoring, access to alumni network and facilitates government grants. SID has an objective to incubate about **10 deep science start-ups every year**. Apart from evaluating the start-ups on **commercial viability**, they measure their ability to have **societal impact**. Currently, SID has a significant number of start-ups who are building products in medical devices, diagnostics etc. that aim to bring down the cost of diagnosis. **Honeywell supported SID** to provide seed capital and funds to the start-ups who are primarily working on projects to build diagnostic devices, vaccines etc. and can make it available at a fraction of cost of existing tests and procedures.

This impact assessment study aims to understand the implementation pathways of CSR contribution to technology business incubator, **analyzing the work of 8 deep science start-ups incubated by SID**.

The impact assessment study **has captured** whether each activity was conducted against the plan, and how the Honeywell CSR funds have supported the selected start-ups to act as a catalyst in implementing their ideas. This study **has not captured** the long-term impact of the program executed by each of the start-ups due to the nature of deep science tech interventions which requires them to do further experimentation and clinical investigations with their products. Through Honeywell's CSR funds, partial support was provided to all the start-ups through SID. Hence it is not possible to directly attribute impact created at each start-up level to exclusively to this project.

From our interactions with the start-ups it was evident that the **support provided by SID was instrumental** in their growth and development. We also noted that SID has provided key support to them in terms of seed funding, systematic access to networks for business development, knowledge and information for R&D and other legal support such as market standards and patent filling. **Out of the 8 start-ups we interacted with, 5 could completely utilize the grant amount** provided to them through the project and completed the planned activities within the stipulated timelines. The rest however, managed to utilize large shares of the funds provided. They were not able to complete the target activities due to several reasons such as COVID-19 lockdown which resulted into supply chain disruption causing delays in importing equipment from abroad, in

clinical investigation. Additionally, they were dependent on seeking funds for the rest of the activities – which were out of scope of Honeywell’s support.

In the report, we have analyzed the outputs of the activities and not the mid-term outcomes or long-term impact, since these start-ups are in their initial stages. They will need a few years’ time to become successful ventures, with viable solutions delivering desired outcomes to the society. Nonetheless it was clear from the study that **SID has identified start-ups with strong potential, clear vision, mission, and goals along with properly charted action plan**. A support from SID to the start-ups regarding **planning of budgets is required** to ensure the activities are carried out within the allocated budgets and timelines and risks are anticipated and mitigation plans are made. Many start-ups were not able to seek clients and customers for their solution. The incubator should additionally focus on this aspect of support to ensure that the start-ups are equipped to kickstart their business and further maintain business continuity.

Honeywell is supporting technology as part of the CSR activity to promote startups with the intent of creating larger social benefit. These institutions can attain required organic growth with required financial support from CSR funding and continue to nurture the entrepreneurial ecosystem. The incubators such as SID could also play a role in strengthening innovative technological entrepreneurship which can contribute to societal impact at large.

2. INTRODUCTION AND PROJECT BACKGROUND

SID was established by Indian Institute of Science (IISc) in 1991. Since then, it has expanded its activities in innovation and entrepreneurship by incubating start-ups based on deep science and technology, irrespective of the origins of the founding team. As of date SID has incubated over 30 start-ups in diverse domains ranging from Medical Devices, BioTech, Communication, SpaceTech, AgriTech, CleanWater, Software etc. SID provides start-ups with space, a small amount of seed funding, access to IP, labs and tools in the Institute, technical and business mentoring, access to alumni network and facilitates government grants.

Honeywell-SID Project Objective

SID has an objective to incubate about 10 deep science start-ups every year. Apart from evaluating the start-ups on commercial viability, they measure their ability to have societal impact. Currently, SID has a significant number of start-ups who are building products in medical diagnostics etc. that aim to bring down the cost of diagnosis. Most of the start-ups incubated are focused on building products that will have a significant impact on the lives of people in India especially those from marginalized sections and live in villages and sub urban areas.

SID submitted a proposal to Honeywell to provide seed capital and funds to the start-ups who are primarily working on projects to build Diagnostic Devices, Vaccines etc. and can make it available at a fraction of cost of existing tests and procedures. The team faced challenges to secure funds for supporting the start-ups. It was also proposed that depending on the quantum of the grant SID would provide branding opportunities for Honeywell in their upcoming new research park.

Goodera reviewed the documents received from SID and observed that there was an initial agreement signed between Honeywell and SID offering support of INR 2 crores. Further details of the amount disbursed to each start-up and related information was mentioned in the form of a CSR proposal form in a word document.

3. OBJECTIVE AND SCOPE OF STUDY

The study aims to understand the implementation pathways of **CSR Contribution to Technology Business Incubator**, analyzing the works of 8 deep science start-ups incubated by Society for Innovation and Development (SID), IISc. The impact assessment study will try to capture whether each activity was conducted against the plan, how they were executed and how the Honeywell CSR funds have supported the selected start-ups to act as a catalyst in implementing their ideas. The major objectives of the study are as follows:

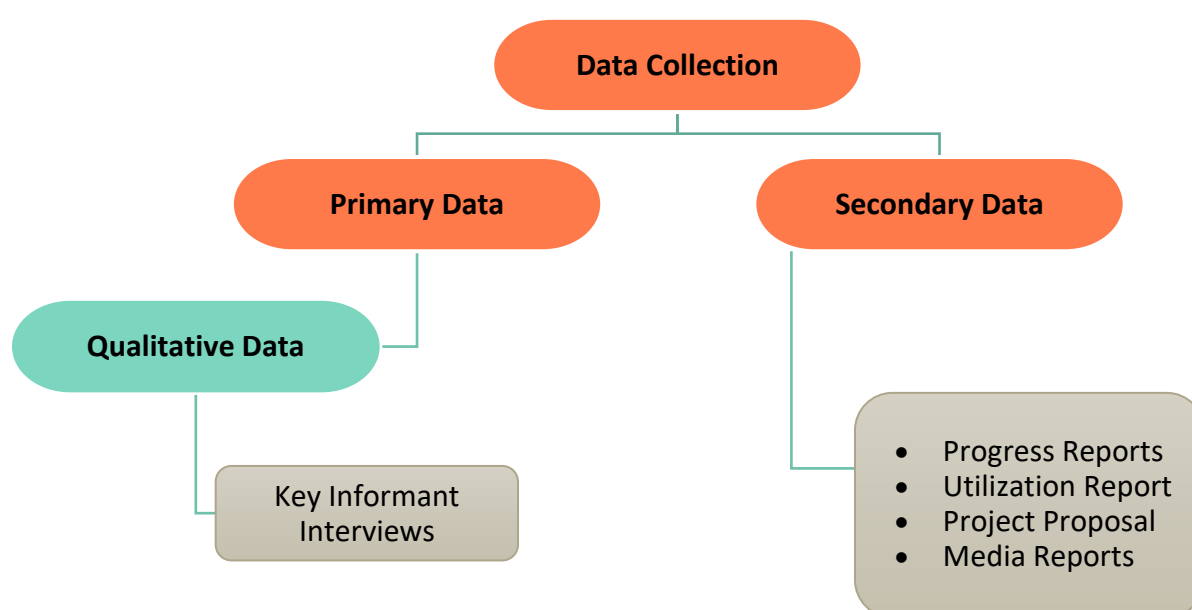
- To assess the relevance and efficiency of the intervention: to review the implementation pathways - assessing process and activities.
- To understand the effectiveness of the intervention - How each activity has led to creating the desired outputs.
- To understand the major success factors and challenges in the intervention.
- To find the areas of improvement across all the factors from program design to implementation and to provide effective recommendations for each start-up.

LIMITATIONS OF STUDY

- The study cannot capture the long-term impact of the program executed by each of the start-ups due to the nature of deep science tech interventions which requires them to do further experimentation and clinical investigation. Also, all the start-ups that we interviewed are in their nascent phases and do not necessarily have scale up and sustainability plans ready.
- The study is conducted virtually, due to the ongoing COVID Pandemic and is not able to triangulate the findings through any physical visit to the labs and manufacturing facilities.
- The CSR funds have only partially supported the start-ups and hence we cannot attribute the project impact completely towards Honeywell.

4. METHODOLOGY

A ‘Qualitative-Approach’ is applied in the study, which ensures that factors such as activities, outputs and outcomes are captured. Qualitative analysis is used to extract the data from founders and the key team members for each of the start-ups. Qualitative method and approaches will provide a better understanding and help to build a storyline for the achievements and gaps in each of the projects. A qualitative study gives substantiated evidence for a better understanding of the processes involved in the program implementation. This approach helps in developing a framework for gap identification, enhancing inclusion and providing recommendations instead of mere calculation of outcome parameters.



SECONDARY DATA

For secondary data, the reports and presentation deck of the projects were referred as shared by SID with Goodera. These documents have given insights about the projects including the overall team structure, inception and implementation phase, processes followed, and feedbacks received. Other supporting documents like articles and newspaper reports were referred to get an understanding about the effectiveness of these interventions.

PRIMARY DATA

Primary data collection is key to collecting evidence from the start-up team members about the intervention, the benefits and challenges and the analysis for recommendations to assess the outcome it has created. The sample has been selected with a purposive sampling method. Purposive sampling, also known as judgmental,

selective, or subjective sampling, is a form of non-probability sampling in which interviewers rely on their own judgment when choosing members of the population to participate in their surveys/discussions.

QUALITATIVE DATA CAPTURE

Key informant Interviews: Questionnaires were designed for each start-up, although questions out of the questionnaire relevant to the project were asked and responses were captured. Interviewees were selected through Purposive Sampling.

SI No	Startups	Stakeholder	Total
1	Equine Biotech	Founder	1
2	Theranautilus Pvt. Ltd.	Founder, Engineer, Co- Founder	3
3	HealthSeq	Founder, Co- Founder	2
4	MMYIK	Founder	1
5	Path Shodh	Founder	1
6	Protein Design	Founder, Scientist	2
7	SIAMAF	Founder	2
8	Azooka Labs	Founder, Co- Founder	2

DATA COLLECTION

The stakeholder interactions were conducted in a one-to-one manner through online meeting applications such as Zoom / G-Meet, phone calls etc. Further data regarding budget utilization were provided directly by the start-ups and the incubator.

5. ANALYSIS AND FINDINGS

We have considered activities and sub activities that took place before the seed funding (or status of the activities) was provided and compared them with the activities that the start-ups could achieve post the incubation support from SID and the seed funding provided by Honeywell. This is to understand the incremental change and improvement that the seed funding brought to the operations of the start-ups. As a part of the analysis, we have also looked at the fund utilization by the startups and tried to explore reasons for under or overspending.

5.1 Start-up: SIAMAF Healthcare Pvt Ltd

Project Background:

SIAMAF was founded with a goal to develop a better standard of cancer care for all. The teams’ idea was to use magnetic nanotechnology to remove the need for radioactivity and strong chemicals for cancer treatment. Magnetic approach is proved to be safe and makes cancer care more affordable and accessible to every patient.

SIAMAF’s first product MafPro is an ultrasensitive hand-held magnetic probe system for staging and localization of breast, uterine, head and neck, and colorectal cancer. The device can tell the exact location of the tumor and how far cancer has spread by using magnetic sensing technology. The device adds flexibility, precision and removes the need for wires and nuclear medicine.

SIAMAF second product MafCyto is designed to remove excess proinflammatory cytokines specifically IL-6 directly from patient’s bloodstream during cytokine storm before it becomes more dangerous. MafLyser Cartridge remains tuned for a certain amount of time depending on the level of cytokines in the bloodstream and then auto stopped without having a lasting effect on the patient.

Assessment Framework:

SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	MafPro:	<ul style="list-style-type: none"> Construction of the pulse induction magnetic nanoparticle (PIMNP) detector is completed. Characterization of PIMNP detector is completed. The device has required sensitivity, specificity, and resolution to detect lymphnodes. 	<ul style="list-style-type: none"> Pre-clinical animal validation for MafPro device and MafTrace dye in rat and rabbit models are completed. High fidelity MafPro device and MafTrace dye are optimized for sentinel node biopsy, lesion localization, and magnetic guided surgery applications. The required

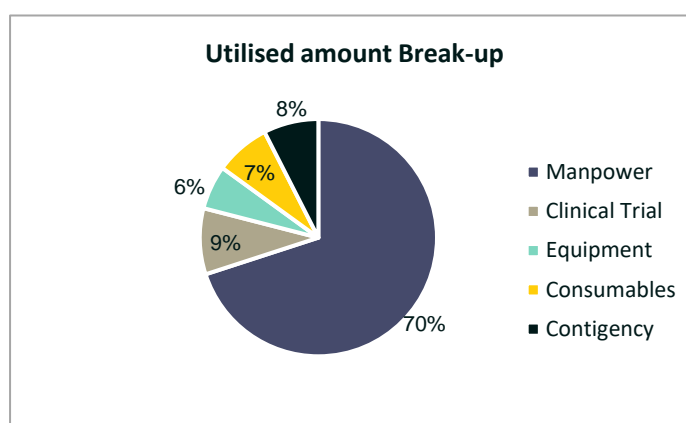
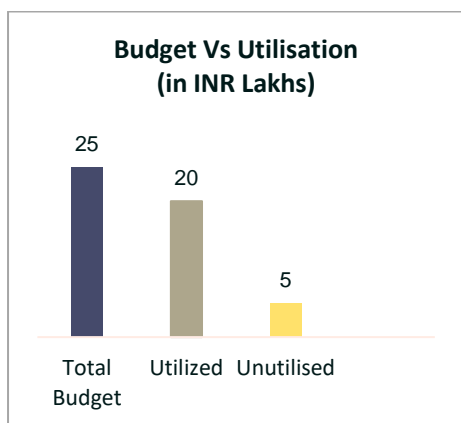
		<ul style="list-style-type: none"> ● Magnetic nanoparticles (MNPs) are synthesized and characterized for maximum magnetization and signal intensity. ● The PIMNP detector was validated in a rat model (in vivo and ex vivo measurements of lymph nodes). ● Development of standardized operating protocols for large animal experiments is completed. Animal ethics approval to conduct large animal experiment has been obtained. 	<p>sensitivity, specificity, and resolution are achieved.</p> <ul style="list-style-type: none"> ● Clinical evaluations of MafPro device, MafTrace dye, and the procedure in 120 breast cancer patients and 90 endometrial patients are currently underway at Narayana Health and Mazumdar Shaw Medical Center. MafPro device and MafTrace dye will be compared to the standard dual technique of radioisotope and blue dye.
2	MafCyto:	<ul style="list-style-type: none"> ● Many COVID-19 patients battling in the ICU due to uncontrolled immune system response called cytokine storm. Patients with the most serious forms COVID had high levels of inflammatory cytokines. Doctors have few tools to help tame this hyperinflammatory condition, which leads to organ failure and death. ● The design of MafCyto was completed. MafCyto a novel magnetic nanoparticle blood filtration device monitors and extracts inflammatory molecules and significantly reduces inflammation associated with cytokine storm to help treat COVID-19 patients more effectively. 	<ul style="list-style-type: none"> ● Micro induction coil magnetometer (MICM) sensors were developed with a detection limit down to 100 fT/VHz. MICM sensors can detect single magnetic particle at a proximity of few micrometers. ● MafLyser cartridge was developed using functionalized magnetic particles (FMPs) tagged with antibodies, mannose, and polyethyleneimine for effective binding to cytokines in blood. ● MafCyto magnetic blood filtration device was constructed using MICM sensors, FMPs, MafLyser cartridge, motorized magnetic mixer, speed controller, peristalsis pumps, heparin pump, and microfluidic channels.

Financial Utilization:

- Total Amount Received: INR 25.00 Lakh (by July 2020)
- Amount utilized by project: INR 20.00 Lakh (by Aug 2021)
- **An 80% financial utilization of the grants**

SN	Particulars	Budgeted amount (INR)	Utilized amount (INR)	% Utilization	Reason for underspend/overspend
1	Manpower (Scientific and Technical)	14,00,000	14,00,000	100%	0
2	Clinical Trial Investigation	6,00,000	1,80,000	30%	INR 4.2 lakhs to be utilized for the upcoming clinical trials

3	Equipment	2,00,000	1,20,000	60%	INR 0.8 lakhs to be utilized for the MafPro software
4	Consumables	1,50,000	1,50,000	100%	0
5	Contingency and Travel	1,50,000	1,50,000	100%	0
	Total	25,00,000	20,00,000	80%	



Other Insights:

- MafPro device and MafTrace dye will be compared to the standard dual technique of radioisotope and blue dye.
- SIAMAF is identifying and working with **appropriate B2B channel partners** (hospitals, clinics) to create effective adoption and purchasing routes into the **target markets**.
- **MafCyto device and MafLyser cartridge would be cost effective** and point of care therapeutic device which would help treating severe COVID-19, sepsis, and cancer patients during cytokine storm before it becomes more dangerous and severe.
- **2 patents were filled** by SIAMAF successfully:
 - i. Apparatus and method for magnetic detection, mixing, and filtration.
 - ii. Pulse Induction Magnetic Nanoparticle Detector for lymph node mapping.
- SIAMAF has developed **partnership with Mazumdar Shaw Medical Center and Narayana Health** to conduct trials for 6-9 months and seek support to move the products in the market. A survey was conducted to understand the market response with 25 oncosurgeons of different hospitals in Bangalore. 90% of the surgeons have showed positive response to buy the device after clinical trials.

- Goodera team did not receive any information related to further market-scale up plan, sustainability and investor interests from this startup yet.

5.2 Start-up: Path Shodh

Project Background:

Path Shodh’s first set of products were designed to leverage the bio-sensing technology for point-of-care devices aimed at providing ease-of-diagnosis and better management of chronic diseases. These products can enable the healthcare professionals to achieve significantly better outcome. Path Shodh has introduced first of its kind handheld device with the capability to measure multiple biomarkers specifically targeting diabetes and its complications, kidney disease, anemia, and liver related ailments. During the COVID outbreak, they started to work to re-purpose their technology and extend it for rapid and accurate COVID-19 antibody diagnostics. This project was partly funded by Honeywell CSR grant.

Assessment Framework:

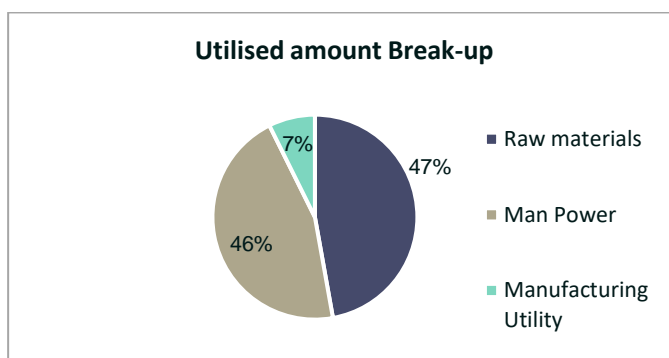
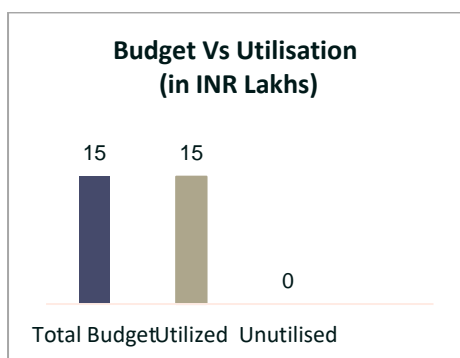
SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	Optimization of sensing chemistry to sense COVID-19 Antibodies	<ul style="list-style-type: none"> • Started: Before the pre incubation phase the start-up was not able to complete their activity, which they planned as a response to the COVID pandemic due to the unavailability of funds. 	<ul style="list-style-type: none"> • Completed: The CSR grant has helped the start up to complete their optimization exercise.
2	Optimization of Point of care device hardware	<ul style="list-style-type: none"> • Started 	<ul style="list-style-type: none"> • Completed
3	Installation of new machine in R/D	<ul style="list-style-type: none"> • Vendor selection happened, but purchase was not done for the R/D machines due to fund inadequacy. 	<ul style="list-style-type: none"> • Installation completed, successfully purchased R/D machines through the grant.

Financial Utilization:

- Total Amount Received: INR 15.00 Lakh
- Amount utilized by project: INR 15.00 Lakh
- **A 100% financial utilization of the grants**

SN	Particulars	Budgeted amount (INR)	Utilized amount (INR)	% Utilization
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1	Raw Materials for chemistry, hardware and R/D machinery	7,07,684	7,07,684	100%
2	Manpower	6,82,316	6,82,316	100%
3	Manufacturing/Utility	1,10,000	1,10,000	100%
	Total	15,00,000	15,00,000	100%



Other Insights:

- Honeywell grant was the **enabler to start the project for semiquantitative measurement of COVID-19 Antibodies**. The product was redesigned and validated to enable highly sensitive electrochemical techniques (SWV, DPV) for sensitivity down to Nano molar range.
- Uniqueness of this product is based on highly sensitive electrochemical principle to detect the COVID-19 IgM and IgG antibodies through specific receptors. The **test can be done with tiny finger prick blood as well as serum samples**. The **result will be displayed on the reader within 5-10 minutes**. This will mitigate the subjective human error while reading qualitative lateral flow kits.
- The **cost of per test will be substantially less than laboratory ELISA kit**. The product is quite affordable.
- Possibility of **connecting test data through APIs to Aarogya Setu application**.
- Indian provisional **patent has been filed on this COVID-19 technology** (No.202041015926).
- Path Shodh **COVID-19 Antibody test has cleared the ICMR Accuracy**. Approvals were also received **the DCGI manufacturing license**.
- There is a potential to enter the market in the rural areas as in the device can perform in terms of portability and remote area access where analyzer and pathology lab cannot be setup. Discussions with the hospitals and clinics is ongoing and team is exploring partnerships with state govts for Sero-surveys and scale up plan is in progress.

- Goodera team did not receive any information related to further market-scale up plan, sustainability and investor interests from this startup yet.

5.3 Start-up: Theranautilus

Project Background:

Theranautilus is a start-up founded by Prof Ambarish Ghosh and others and is building dental nanorobots, targeting bacterial colonies in dental tissues during root canal procedures that are currently unreachable using existing tools.

Product Development: Theradrive is the magnetic coil designed to fit inside a human mouth to drive and guide nanorobots inside the dentinal tubules. They have also envisioned a device called Therablaze that can heat the nanorobots once they have reached their destination. Therablaze would generate an Alternating Magnetic Field (AMF) of ~10-50 kHz to inductively heat the nanorobots to kill bacteria. A plan for the Therablaze device has been made.

Assessment Framework:

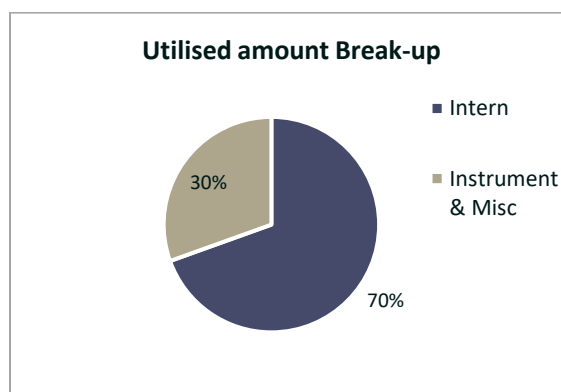
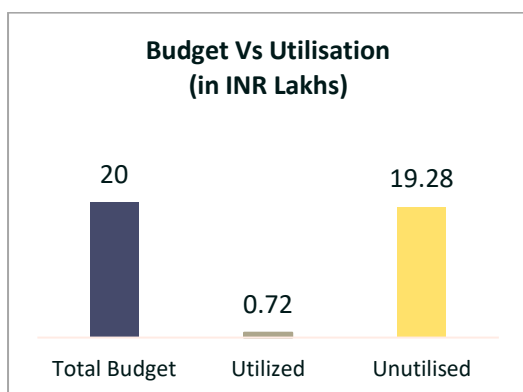
SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	Manpower hiring	Not undertaken due to lack of funds.	An employee was hired who joined on 1st September.
2	Device design	Not undertaken due to lack of funds.	CAD design was completed. Hardware manufacture is underway.
3	Patent	Not undertaken due to lack of funds.	Experiments are underway. Patents will be filed soon.

Financial Utilization:

- Total Amount Received: INR 20 Lakhs
- Amount utilized by project: INR 0.71 Lakhs
- **A 3.6 % financial utilization of the grants**

SN	Particulars	Budgeted amount (INR)	Utilized amount (INR)	% Utilization	Reason for underspend/overspend
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1	Manpower Hiring (Electrical Engineer)	60,00,00	0	0%	Employee Joined on 1st September, 2021.
2	Intern for Power Amplifier development	50,000	50,000	100%	
3	PCT filing (Patent for a new system)	4,00,000	0	0%	Experiments completed. Patent writing is ongoing.
4	Instrument and miscellaneous Purchase	1,50,000	21,925	14.6%	Will be used in the purchase of autoclave and data storage space.
5	PCT filing (Patent)	4,00,000	0	0%	Experiments are ongoing. Will be filed post that.
6	Manufacturing and testing of Theradrive and Therablaze	4,00,000	0	0%	Employees Joined on 1 st September 2021. CAD design is completed. Amount to be spent in September 2021.
Total		20,00,000	71,925	3.6%	



Other Insights:

- Theranutilus has received substantial attention from dentists across the world. It would improve the quality of life for millions of people across the world.
- The Government of India has conferred the **Technology Development Board award under the start-up category.**
- **International Association for Dental Research (IADR)** has recognized the research and declared it the winner in Basic science category.
- **The team is exploring the market and discussions are ongoing to get interest from the partners/clients as the experimentation and product finalization stage is still ongoing.**

- **Sustainability:** Theranautilus aims to become financially viable by late 2023. The major product namely, Theradrive has received substantial interest for licensing and marketing from major players in dentistry once the animal testing and toxicity studies are completed. The launch plan for products related to dental hygiene will be available soon once the finishes filling of patents and publish the proof of concepts.
- **Investor interests:** Theranautilus has received interest from both international and national players such as India Angel Network and AI Foundry for early investments. Some investment partner from Europe is also in talks about the product development.
- **Market scale-up plan:** Theradrive will soon go for regulatory approval and short scale testing in various hospitals across Bangalore and India. **The** other products for oral health would not require such extensive regulatory process and will be marketed soon.

5.4 Start-up: HealthSeq

Project Background:

Healthseq Precision Medicine Pvt Ltd was Incubated at IISc, Bangalore India. It is founded by highly experienced scientists with a single-minded goal of developing solutions in precision medicine working in genomics, bioinformatics, systems biology, pharmacology, structural biology, drug discovery, infectious diseases, cancer and expertise in AI, computational mechanics, parallel computing, systems engineering, reliability engineering. etc.

They use a systems approach, combining data from variety of sources to enable targeted therapy, reduce risk and increase efficiencies in the healthcare system.

The project funded by Honeywell’s immediate focus was on Precision diagnostics – To find molecular biomarkers for disease diagnosis, response to treatment and vaccine efficacy. The funding first released in June 2020 and second tranche was released in April 2021.

Respiratory diseases and COVID related work- specifically on easy-to-use biomarkers were planned to be launched. A new set of genome and transcriptome pipelines were proposed to be developed using cloud computing

Assessment Framework:

SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding

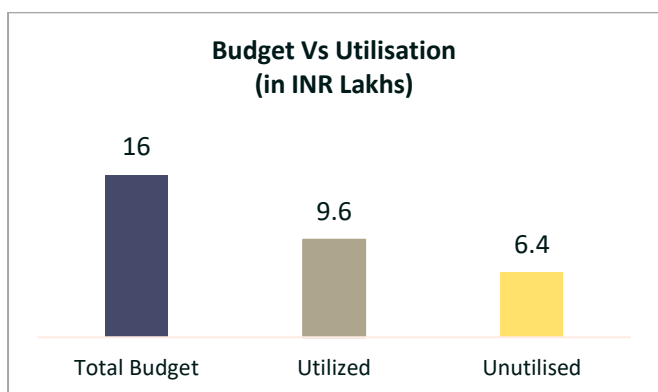
1	Company formation	Completed	
2	Compliance, MCA, GST, DIPP	It was partly completed	Fully completed
3	Recruitment of interns		Commenced and completed (after June 2020)
4	Recruitment of research scientists		From September 2020
5	Migration to cloud computing		Commenced and completed after June 2020
6	Pilot project on peptides with Yantra company		Commenced after June 2020, project ongoing, patent filed
7	Development of biomarkers for Asthma COPD		Commenced after June 2020, to be completed by March 22
8	Work on palliative care development with SSRC		Pilot project started. To be completed by March 22
9	Vaccine efficacy pipelines		Commenced in March 21, to be completed by March 22
10	Development of biomarkers for response to treatment of TB		Commenced in April 21, to be completed by March 23
11	Development of cancer therapy pipelines		To commence in April 22, to be completed by March 24

Financial Utilization:

- Amount Received: INR 25 Lakhs (First tranche: 2020, Second tranche: April 2021)
- Amount Utilized: INR 9.60 Lakhs (Around INR 2 Lakhs was spent on Google cloud, websites, furniture etc. initially by the founders and is considered as unsecured loan from the Directors. No remuneration was given to the Founders and Directors of the company).
- The unutilized amount has been marked for the development of biomarkers in FY 21-22 and therapy for cancer treatment.

SN	Month of Utilization	Particulars	Budgeted amount (INR)	Utilized amount (INR)	% Utilization	Reason for underspend/overspend
1	July'20	Office setup, Incubation, etc (Virtual due to COVID), Website etc	2,00,000	-	-	Absorbed by Founders, as initial seeding
2	Aug'20	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	15,000	15%	Cloud credits used, manpower ramp up delayed by COVID

3	Sep'20	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	65,000	65%	Cloud credits used, manpower ramp up delayed by COVID
4	Oct'20	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	60,000	60%	Cloud credits used
5	Nov'20	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	57,000	57%	Cloud credits used
6	Dec'20	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	78,000	78%	Cloud credits used
7	Jan'21	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	45,000	45%	Cloud credits used
8	Feb'21	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	0	0%	Cloud credits used, manpower spend absorbed by income from pilot project
9	March'21	Manpower, Internet, Communication and Cloud, Misc.	1,00,000	90,000	90%	Cloud credits used
10	April'21	Manpower, Internet, Communication and Cloud, Misc.	1,50,000	1,30,000	86%	Part use of cloud credits
11	May'21	Manpower, Internet, Communication and Cloud, Misc.	1,50,000	1,40,000	93%	Part use of cloud credits
12	June'21	Manpower, Internet, Communication and Cloud, Misc.	1,50,000	1,40,000	93%	Cloud credits used, manpower ramp up delayed by COVID
13	July'21	Manpower, Internet, Communication and Cloud, Misc.	1,40,000	1,40,000	100%	Cloud credits used
		Total	16,00,000	9,60,000	60%	



***Note:** The data for the utilization of funds received from the startup is divided as per the months and not as per the budget heads. Hence it is not possible to show the percentage utilization as per the budget heads.

Other Insights:

- Company has developed **strong linkages with healthcare experts** (Shankara cancer hospital and research centre, Bangalore, Aster Hospital, MS Ramaiah hospital, Bangalore hospital, Madras Diabetes Research Foundation, Samatvam Endocrinology Centre and Excel care hospital).
- Health Seq will further focus on:
 - **Biomarkers for Immune profiling of individuals and their use in diagnosis**
 - **Precision Therapy recommendations**
 - **Health and Wellness Status**
 - **Health systems**
- HealthSeq established a **seamless transition to use digital technology during this phase:**
 - Use of HPC cloud computing for genome analysis
 - Development of biological databases
 - AI and ML technology
 - Systems Engineering
- The company has made several **proposals to DBT, DST, International Organizations interested in specific diseases** and expects to be able to receive projects.
- The company **has received a few projects from hospitals, and global companies** based on the expertise it has developed.
- **Several venture capital companies and investors** have also shown **initial interest**.
- **Sustainability plan:** The company will use seed funding, income from services and grants to sustain the company, build products and IP for a period of 36 months. The team plans to present the idea to investors during FY:2023-24.
- **Investor interests:** Discussions have been held with investors interested in precision medicine, but it was found appropriate to present a portfolio before further progress is made on investment. At present the team plans to focus on sustained IP building using grants with equity coming in next phase for scaleup.
- **Market scale – up plan:** The team plans to carry out trials and tests, seek regulatory approvals and license the technology in the next phase.

5.5 Start-up: Equine Biotech

Project Background:

The company started off with a vision to address diagnostic inadequacies mainly at the interface of human-animal interactions, predominantly focusing on the veterinary world. The current COVID-19 pandemic provided them with an opportunity to use the knowledge gained through the years of diagnostic research to

create quick, sensitive, and reliable diagnostic tools for SARS- CoV 2. Furthermore, the know how created from this endeavor will facilitate the development of diagnostic tools for various other neglected and emerging diseases.

Assessment Framework:

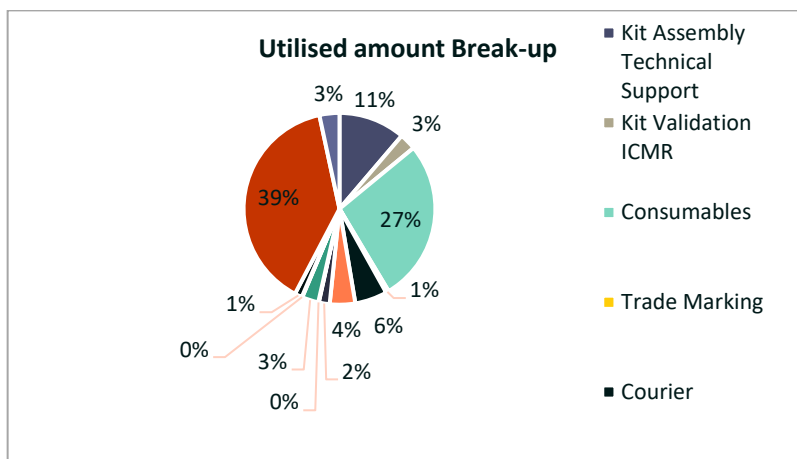
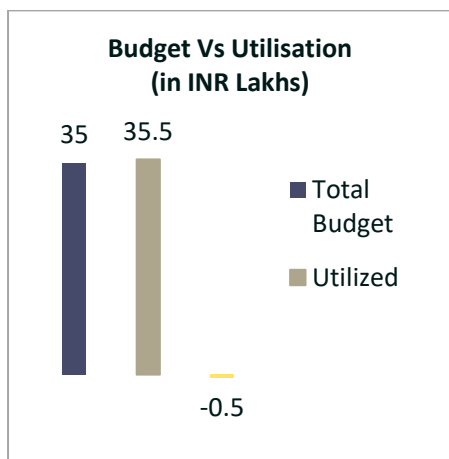
SN	Activity	Output
		Post receiving seed funding
1	R and D towards designing a rapid and accurate RTPCR Kit for Covid 19	Successfully designed a kit.
2	Application for ICMR approval	Received ICMR approval.
3	Obtaining test license from CDSCO and creating sample kits	Got the test license and created sample kits for validations.
4	Liasoning with the manufacturers for mass production	Discussed with several manufacturers.
5	Licensing the kit	Licensed the kit was done.

Financial Utilization:

- Total Amount Received: INR 35 Lakhs
- Amount utilized by project: INR 35.59 Lakhs
- 100 % of the utilization of funds were done.
- **Additional funds (59,079 INR) received from other donors to complete the purchasing of equipment and adjust salaries of the staff.**

SN	Particulars	Budgeted amount (INR)	Utilized amount (INR)	% Utilization	Reason for under/over spend
1	Kit Assembly Technical Support	400000	400000	100%	
2	Kit Validation ICMR	100000	100000	100%	
3	Consumables	950000	974681	102.6%	Equipment imported from abroad. Due to lockdown cost price increased.
4	Trade Marking	20000	17100	85.5%	
5	Courier	200000	193552	96.7%	
6	Customs Duty	150000	152533	101.7%	
7	Lawyer	60000	65000	108%	
8	Office Expenses	10000	3400	34%	

9	Outsourcing	100000	99120	99.1%	
10	Sundry Expenses	10000	3199	31.9%	
11	Travel	50000	44454	88.9%	
12	Staff Salaries	1330000	1386040	104.2%	
13	Reference Kit Purchases	120000	120000	100%	
	Total	3500000	3559079	100%	



Other Insights:

- Sustainability:** Equine Biotech is the amalgamation of decades of research conducted by Prof. Utpal Tatu in the field of zoonotic diseases. The team shared that the Global COVID-19 RT-PCR kit aims to relieve the burden on diagnostics labs by being easy-to-use, quick, and reliable by reducing the ambiguity in the results and has a great basis for becoming an industry leading kit.
- Investor Interests:** The company is trying to license it out and manufacture at a large scale in partnership with 2 definite manufacturers at the moment. Prof. Tatu mentioned they will not be able to reveal the client/customer names as they plan to do a proper launch in the market.
- Market scale-up plan:** The Global COVID-19 RT-PCR kit has received the ICMR validation and approval for use, after which the kit has been further validated by independent diagnostic labs successfully. Using the knowledge gained by these validations, the team has tweaked small aspects of the kit which has greatly improved its usability and reliability. The team has shared as a next step it is making efforts to scale-up manufacturing to meet the growing market demand. Equine biotech’s management is working on identifying key investors and forming strategic partnerships with various companies for subsequent marketing and distribution of the kits. With their current manufacturing capacity, it is possible to produce around 1,000 reactions (10 kits) per week. Upon successful implementation of their scale-up plan, the estimate of this production capability is expected to rise to more than 200,000 (2000 kits) reactions per week.

5.6 Start-up: Azooka Labs

Project Background:

The company started off with a vision to address diagnostic inadequacies mainly at the interface of human-animal interactions, predominantly focusing on the veterinary world. The current COVID-19 pandemic

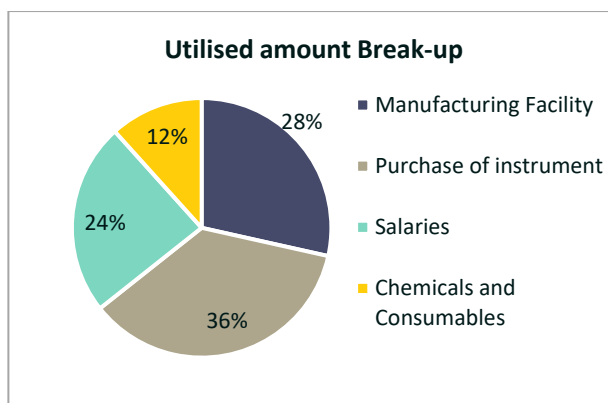
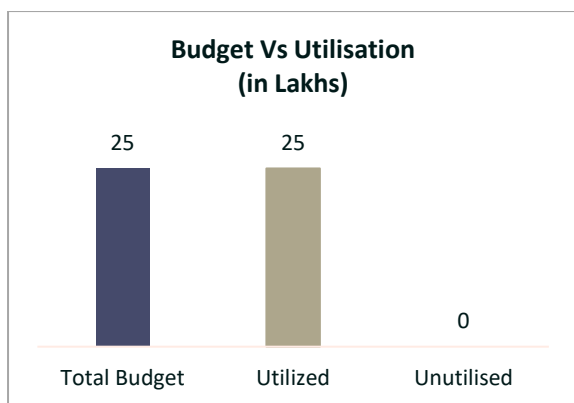
provided them with an opportunity to use the knowledge gained through several years of diagnostic research to create quick, sensitive, and reliable diagnostic tools for SARS- CoV 2. It is the only kit developed in India till date which will retain its property without a proper cold-storage facility. Furthermore, the know how created from this endeavor will facilitate the development of diagnostic tools for various other neglected and emerging diseases. **Assessment Framework:**

SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	Manufacturing facility	Incubated and lab space at SID, IISc.	Lease of their own Manufacturing facility , 1550 square feet space at Peenya Industrial Area, Bengaluru
2	Instrumentation	Dependent on SID's instruments	Purchase of instruments for RandD: -20 deg deep freezer, milliQ water purification system, ELISA reader, Magnetic stirrer, 4 deg refrigerators, chemical hood and basic laboratory glassware and tables.
3	Products	Research Use Product Launch in March 2020	Covid 19 Diagnostics Product (RNA Wrapr) covid 19 sample collection kit was launched in the market during July 2020
4	Certifications	CE	ICMR validation for RNA Wrapr was obtained in Aug 2020
5	Customers	1 or 2 customers from Academia for RUO products	Onboarded hospitals like Shankar Cancer Research and Orbito Asia as customers for covid 19 Molecular transport Medium

Financial Utilization:

- Total Amount Received: INR 25 Lakhs.
- Amount utilized by project: INR 25 Lakhs.
- **100% utilization of the funds received from Honeywell.**

S N	Particulars	Budgeted amount (INR Lakhs)	Utilized amount (INR Lakhs)	% Utilization	Reason for underspend/overspend
1	Manufacturing facility Lease	700000	712358	101.8%	
2	Purchase of instrument/equipment	700000	896000	128%	Had to purchase the instruments that came with the facility and the price crossed the budget
3	Salaries (4 months)	600000	600000	100%	
4	Chemicals and Consumables for RNA Wrapr (Product development)	500000	291642	58.4%	Did not have sufficient funds and had to pitch in from other grants
	Total	2500000	2500000	100%	Total grant amount utilized



Other Insights:

- The Global COVID-19 RT-PCR kit **addresses the issues of increasing capacity constraints, long run time of RT-PCR tests by having a short run time, high sensitivity**, ability to be used with extraction-free samples, and overall, a very easy to use protocol.
- The Global COVID-19 RT-PCR kit has one of **the shortest run times among all other RT-PCR diagnostic kits available in the Indian market, at 45 minutes**. It is also one of the most sensitive (1 copy per reaction). Given the global impact of the pandemic, the company had decided not to patent the design so that the kit can be manufactured without limitations.
- The startup is targeting to become a L2 player in the market to manufacture 1 lakh units per day and get customers or tender to supply in Indian as well as export markets.
- Azooka labs has been getting a good **coverage in the media for the innovative work** done in the COVID times. Few links to refer:
 - <https://twitter.com/kiranshaw/status/1338853539825643522>
 - <https://twitter.com/kiranshaw/status/1367106818783215616>
 - <https://www.youtube.com/watch?v=Eg75K6HPvvo&t=832s>
 - <https://www.pandemicresponsecolab.org/challenges/2020/reimagining-early-warning-systems/c/contribution/88>
 - <https://www.youtube.com/watch?v=LH53faHuQ5g>
 - https://www.youtube.com/watch?v=Gr_8akhkR24&list=PL1o5aa59lapj62nDxC43AITNCI075y2z6
 - <https://www.ramaiah-evolute.com>
- **Sustainability:** The company is receiving substantial interests from many investors who are in pipeline.
- **Investor interests:** In a program run by DST called India Innovation Growth Programme (a collaboration between DST, Lockheed Martin Corporation, and TATA Trust) where they select products that can have a huge impact in India and globally, Azooka Labs were among the top 10 innovators who were selected. The team had visited MIT and Harvard to understand how schools (tech and business schools) scale innovation globally. They've also given funds for global expansion. They also get mentoring support from Indian Institute of Management, Ahmedabad.
- **Market scale-up plan:** The team had interactions with some of the customers to know the prospects of Ano Cell stains. Many of them have showed interest and asked if they could include it in their catalogue before the product is released.

Azooka Labs is also looking at bioimaging where fluorophores can help biologists view biological systems. Their focus is also to come up with fluorophores in the Infrared (IR) region. The team is making efforts to tap European markets in coming months.

5.7 Start-up: Protein Design

Project Background:

The company was formed to develop technologies for engineering and producing proteins and antibodies for applications ranging from research and development, academic explorations, diagnostics setups and even therapeutics. The present development plan includes introducing expression ready clones for various Biosimilars and biologics which can be done faster through a machine.

Assessment Framework:

SN	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	Equipment purchase	Was not possible due to lack of funds	Purchased a Protein Purification equipment, AKTastart.
2	Customers	Were unable to take on projects	It has significantly enhanced the ability to purify the proteins and so far, they have carried out such projects for several customers.

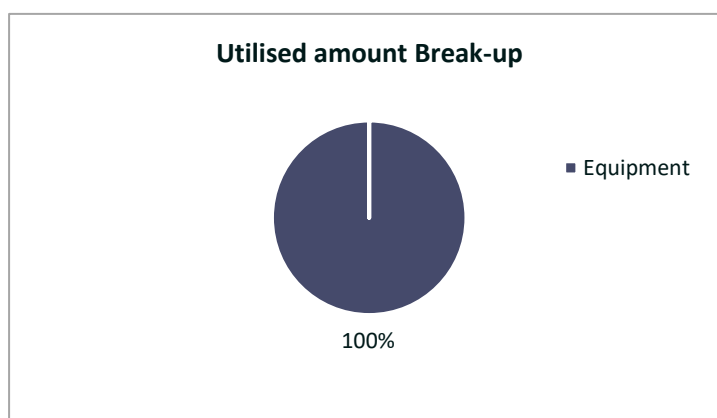
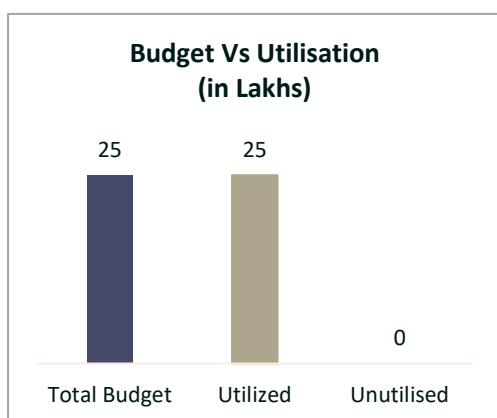
Other Insights:

- The startup has secured BIRAC funding for purchase of other equipment and to carry out experimentation of several projects.
- Goodera team did not receive any information related to further market-scale up plan, sustainability and investor interests from this startup yet.

Financial Utilization:

- Total Amount Received: INR 25 Lakhs.
- Amount utilized by project: INR 25 Lakhs.
- **100% utilization of the funds received from Honeywell.**

SN	Particulars	Budgeted amount (INR)	Utilised amount (INR)	% Utilisation	Reason for underspend/overspend
1	Equipment	2500000	2500000	100%	
	Total	2500000	2500000	100%	Total grant amount utilised



5.8 Start-up: MIMYK

Project Background:

Mimyk is a deep-tech spin-off from the Indian Institute of Science (IISc), Bengaluru. It is working towards building intelligent and immersive solutions for medical procedures. These systems are powered by AR/VR, Robotics, and Visual Computing technologies.

Mimyk’s first product is a novel Virtual Reality (VR) and haptics enabled simulation platform for endoscopy procedures. It is working on extending the technology to enable computer-aided medical procedures. The initial technologies were developed as part of a collaborative Research and Development effort at the M2D2 Lab, IISc and the Visualization and Graphics Lab (VGL), IISc.

Assessment Framework:

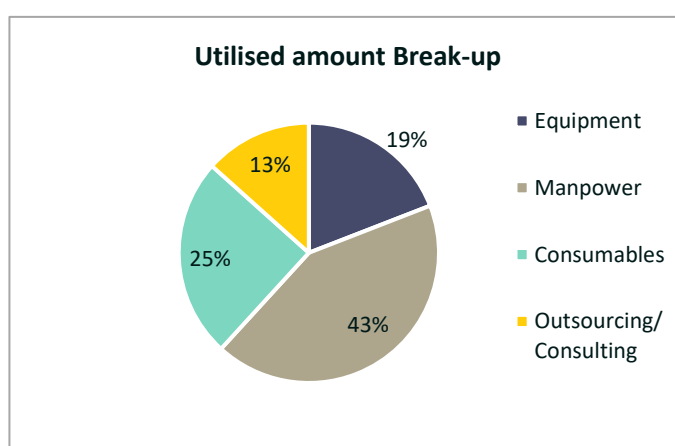
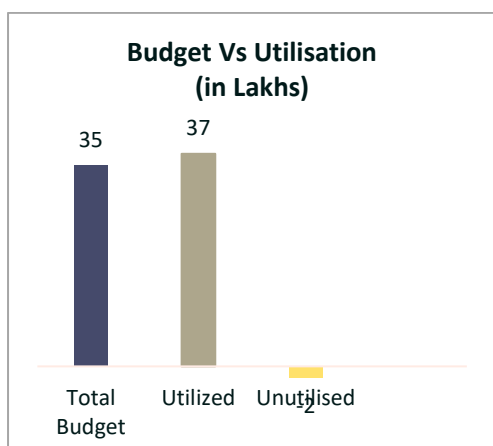
S.no	Activity	Output	
		Pre-Incubation / before receiving the seed funding	Post-Incubation / after receiving the seed funding
1	Haptic base development	PoC developed	Final design of the haptic base

2	Development of embedded control board	Concept board demonstrated	A working embedded board developed
3	Control handle design and development	PoC developed	Final prototype
4	Integration of the simulation model	Simulation engine with no cases	Advanced simulations with variety of cases
5	Advanced prototype	Laboratory prototype	Advanced prototype demonstrated to clinicians

Financial Utilization:

- Total Amount Received: INR 35 Lakhs.
- Amount utilized by project: INR 37 Lakhs. An amount of 2 lakhs were sourced from other donors.
- **100% utilization of funds received from Honeywell.**

SN	Particulars	Budgeted amount (INR)	Utilised amount (INR)	% Utilisation	Reason for underspend/overspend
1	Equipment	7,00,000	7,00,000	100%	
2	Manpower	13,64,000	15,64,000	115%	2 lakhs INR was sourced from another donor.
3	Consumables	9,10,000	9,10,000	100%	
4	Outsourcing/Consulting	4,90,000	4,90,000	100%	
	Total	35,00,000	37,00,000	106%	Total grant amount utilised



Other Insights:

- EndoMimyk has been **used to train novice doctors in various medical workshops**
- Various procedure **training modules are developed** in Endoscopy, Colonoscopy, Bronchoscopy, and TEE.
- Sustainability plan: Mimyk is trying to raise private funds to take the product to the maker. Mimyk has also received government grants for development and commercialisation.
- **Investor interests:** Mimyk is in touch with several investors and Venture Capital (VC) funds. It has already raised an Angel round in 2020.
- **Market scale – up plan:** In terms of commercial-scale production, the manufacturing of components will be outsourced, and the product will be assembled in-house. The proposed product will be sold by Mimyk to customers through various sales channels. Since the product is a high-end technology system, the team plans to make tie-ups with experienced medical equipment sales and distribution companies as they will have a good understanding of the system and have expertise in sales of hi-end equipment to medical schools. Mimyk is also exploring the opportunity of collaborating with device manufacturers.

5.9 SID’s Support to Startups

SID provides world class infrastructure to startups, rental free space for their duration of stay in the incubation center, access to labs at IISc, technical mentorship by faculty at IISc, business mentorship, and insurance cover for founders and startup employees and their families.

SID is a **focused Deep Science incubator with a single purpose mission to help start-ups commercialize science** and recognize the challenges faced by Deep Science entrepreneurs and work towards mitigating the challenges and risks they face. This translates to rental free **incubation for three to five years**, deep technical mentorship with IISc faculty, global connects leveraging IISc alumni, and connects with global VC firms.

While generic start-up challenges like product-market fit and raising capital remain the same, Deep Science start-ups have additional unique challenges. It takes a significantly longer period for Deep Science start-ups to bring their technology to market. While software start-ups can build their MVP (minimal viable product) in a short period of about 12 months, **Deep Science start-ups take on an average three to five years before they can build a MVP** to take to market. The need for sophisticated labs, equipment, materials, and prototyping facility means that **it takes more capital to build an MVP**. SID attempts to give access and connect to a global community of IISc alumni, investors, government, and commercial entities. In addition, they have a model of deep **business mentorship**, associating startups with mentors in respective domains and providing specific case to case support to each startup to help them achieve their goals.

Goodera team based on its interactions with the key team members and founders of all the 8 startups concludes that the teams’ have expressed their overall satisfaction and gratitude for the support received from SID team. Many of them have received guidance for filling patents and other intellectual property, networking opportunity with leading researchers, access to mentorship from academia, lab access. A detailed response from all the startups is requested to highlight the exact support that they received from SID.

#	Startups/Support received	Infrastructure	Access to labs	Access to sector experts	Knowledge networks	Marketing /Customer acquisition guidance	Patent filing	Alternate funding/donor
1	Equine Biotech	Yes, Rental free space						Seed capital
2	Theranautilus Pvt. Ltd.	Yes, Rental free space	Yes	Yes, support received in research and design	Yes	Yes	Yes	Yes, funds & awards from govt.
3	HealthSeq	Yes, Rental free space	Yes, For experimentation	Yes	Yes	Yes	Yes	Constant support for fund information.
4	MMYIK	Yes, Rental free space	Yes	Yes	Yes	Yes	Yes	Yes, connected with

								funding agencies
5	Path Shodh	Yes, Rental free space				Yes, support in creating initial proposal submission to DST	Yes	Seed capital
6	Protein Design	Yes, Rental free space	Yes, Access to biotechnology dept. lab					Seed capital
7	SIAMAF	Yes, Rental free space					Yes	Seed capital
8	Azooka Labs	Yes, Rental free space						Seed capital

6. CONCLUSION

From the study it was concluded that the support provided by the incubator SID to all the 8 start-ups was crucial for their progress to take their ventures to the new level. Among the 8 start-ups, five could utilize the complete amount of the grant and complete the target activities within the stipulated timelines, whereas others managed to utilize a majority of their funds. Few start-ups who wished to purchase of equipment were not able to utilize the grant amount due to the various COVID related disruptions in their plan.

The report could only analyze the outputs of the activities and not the mid-term outcomes or long-term impact. This is due to the reason that these start-ups are in their initial stages and it will take some more time to understand which star-ups among them turn out as successful ventures, with viable solutions deriving desired outcomes to the society. Nonetheless it was clear from the study that SID has identified start-ups with strong potential, clear vision, mission and goals along with properly charted action plan. These will bring out transformational and significant contributions to our society. The major immediate outcomes observed from the study for each of the startups are given below:

Sl no	Start Up	Major outcome post seed funding
1	SIAMAF Healthcare Pvt Ltd	<ul style="list-style-type: none"> ✓ Pre-clinical animal validation for MafPro device completed. ✓ Tie up with different hospitals started for clinical trials. ✓ New Micro induction coil magnetometer (MICM), Maflyser catridge sensors were developed.
2	Path Shodh	<ul style="list-style-type: none"> ✓ Optimization of Point of care device hardware completed. ✓ Installation of new machines for R&D completed.
3	Theranautilus	<ul style="list-style-type: none"> ✓ CAD engineer hired, design of device completed, experiments underway.
4	HealthSeq	<ul style="list-style-type: none"> ✓ Recruitment of interns, researchers done. ✓ Migration to cloud computing done. ✓ Biomarkers development started, partnerships with several companies done.
5	Equine Biotech	<ul style="list-style-type: none"> ✓ Designed an RTPCR Kit with ICMR approval, Got the test license and created sample kits for validations.
6	Azooka Labs	<ul style="list-style-type: none"> ✓ Leased manufacturing facility, R&D instruments purchased. ✓ COVID 19 sample collection kit launched with ICMR approval and onboarded hospitals for COVID 19 Molecular transport Medium.

7	Protein Design	<ul style="list-style-type: none"> ✓ Purchased a Protein Purification equipment which has significantly enhanced the ability to purify the proteins and so far, they have carried out such projects for several customers.
8	MIMYK	<ul style="list-style-type: none"> ✓ Haptic base and embedded control board developed. ✓ Advanced prototype demonstrated to clinicians.

7.RECOMMENDATIONS

In the light of our findings and conclusions, Goodera recommends below actions:

1. Few of the start-ups were not able to complete the target activities due to lack of funds against the planned activities. A support from **SID to the start-ups regarding planning of budgets** is required to ensure the activities are carried out within the stipulated budgets and timelines.
2. Many of the start-ups mentioned that the incubating fund they received, could cover only a part of their actual need. Hence, we recommend that the incubator **can reduce the number of start-ups to support in order to increase the size of the funding per start-up**. This may ensure that the contribution is significant to set the start-ups on the path of success.
3. A study on **long term impact** can be planned to understand how each of these start-ups have developed their solutions and are meaningfully contributing towards society. Currently, as a part of this study, only activities which were completed by the start-ups were analyzed and not their outcomes.
4. Many start-ups were not able to seek clients and customers for their solution. The incubator should focus more on this aspect to make sure the start-ups are equipped to **kickstart their business and further maintain business continuity**.

8. ANNEXURE

Guided Questionnaires

General Questions

1. Name of the Start-up
2. Background
 - Please mention the objective of the program initiated by the start-up.
 - How is the idea aligned to any of the SDG goals?
 - Please share the Ideation/Conceptualization journey of the start-up.
 - What is the domain of the start-up?
 - What is the problem the start-up is trying to address?
3. Market Opportunities
 - Who are your customers?
 - Who are your competitors?
 - In which geographical locations is the start-up present now?
4. Team Background
 - Team Size
 - Education Qualifications
 - Years of Experience
 - Roles and Responsibilities
5. Financials
 - What were the objectives set against the funds received from Honeywell?
 - When did you receive the funds from Honeywell? Please mention the fund details.
 - Did you receive funds from other sources? What is the share of the funds received from Honeywell as a percentage of the total?
 - Have you received any subsequent funds? If yes, please share the details.
 - Please share the break-up of the allocated funds received from Honeywell (HW) CSR and the utilization against each component.
 - How adequate was the fund received from Honeywell to carry out your project objectives?
6. Product/Service
 - What are the key steps/activities taken to develop the product or service?
 - What are the key differentiators of the product /service compared to existing ones?
 - Were there any approvals required? If yes, please mention the details.
 - Have you achieved your project objectives by now(%)? At what stage is your project now?

- What is the % of target achieved against the initial objectives set for the funds received from Honeywell?
- What are the key success indicators of your program?
- What will be the mid to long term goal of the business? What will be the timeframe for that?
- Has there been any coverage in the media about the works of your start-up?
- What are the delays/challenges you are facing in currently? mitigation What is the immediate support your project requires to move forward? Do you already have those support in place?

7. Others

- Have you received any other support from HW?
- How is IISc supporting you in achieving the objective?
- How will you rate the support you received from IISc (1 to 5)?
- How will you rate the support you received from HW (1 to 5)?

Project/Start-up Specific guided questionnaire

A. Equine Biotech

1. Please mention the manufacturing partner of the kits.
 - Global COVID-19 RT-PCR kit
 - COVID-19 RAT kit
2. What is the technology used for developing the kits? What is the duration of the development?
3. What is the production cost per unit?
4. Did we conduct any validation for the kits manufactured by the companies?
5. How many products were sold to the market? Did we receive any government orders?
6. How effective are the kits in terms diagnostics compared to the ones already in market? Did you receive any user feedback?
7. Describe the impact created by the program till date post funding by Honeywell.
 - Social impact
 - Market penetration

B. Theranautilus Pvt Ltd

1. What activities were carried out to develop the Nanorobot-product development?
2. What is the technology used for developing the kits? What is the duration of the development?
3. What is the planned production cost per nanorobot?
4. Please share the marketing plan and revenue streams analyzed for the product.

5. Has the patent been filed yet? If yes, share the patent ID. How does this contribute for any significant social impact?

C. HealthSeq

1. Please mention the objective of the program initiated by Healthseq?
2. When did you receive the funds from Honeywell? Please mention the fund details.
3. Did you receive funds from other donors? What is the share of the funds received from Honeywell?
4. What activities were carried out to develop the biomarkers for Precision Diagnostics.

D. MMYIK

1. How many medical workshops have been conducted? What is the average response rate on adaption of EndoMimyik?
2. How many doctors have been trained on this application? How many of them have started using the application?
3. Do we know the no. of patients treated with this application? How many cases were successful?
4. How many people were hired post seed funding?
5. Has the PCT technology developed yet? How is it useful for the endoscopy application?
6. Has the patent been filed yet? If yes, share the patent ID. How does this contribute for any significant social impact?
7. Does this application contribute to reduction of cost of endoscopy for the patients? If yes, by what percentage does the treatment cost reduces?

E. Path Shodh

1. Elaborate on the unique technology used for the rapid COVID19 diagnostics.
2. Do we know the no. of patients treated with this application? How many cases were successful?
3. How many people were hired post seed funding?
4. How many market players have bought this product? What is the feedback received?
5. Do we have data on no. of customers who used for rapid testing? What is their feedback on the technology used?
6. Does this application contribute to reduction of cost of testing for the patients? If yes, by what percentage does the treatment cost reduces?

F. Protein Design

1. When was the purchase of AKTastart done?

2. How many people were hired/trained post seed funding?
3. How many market players have bought this product? What is the feedback received?
4. How does this purification system help the protein purification process?

G. SIAMAF (Discussion based on the general questions)

H. Azooka Labs (Discussion based on the general questions)