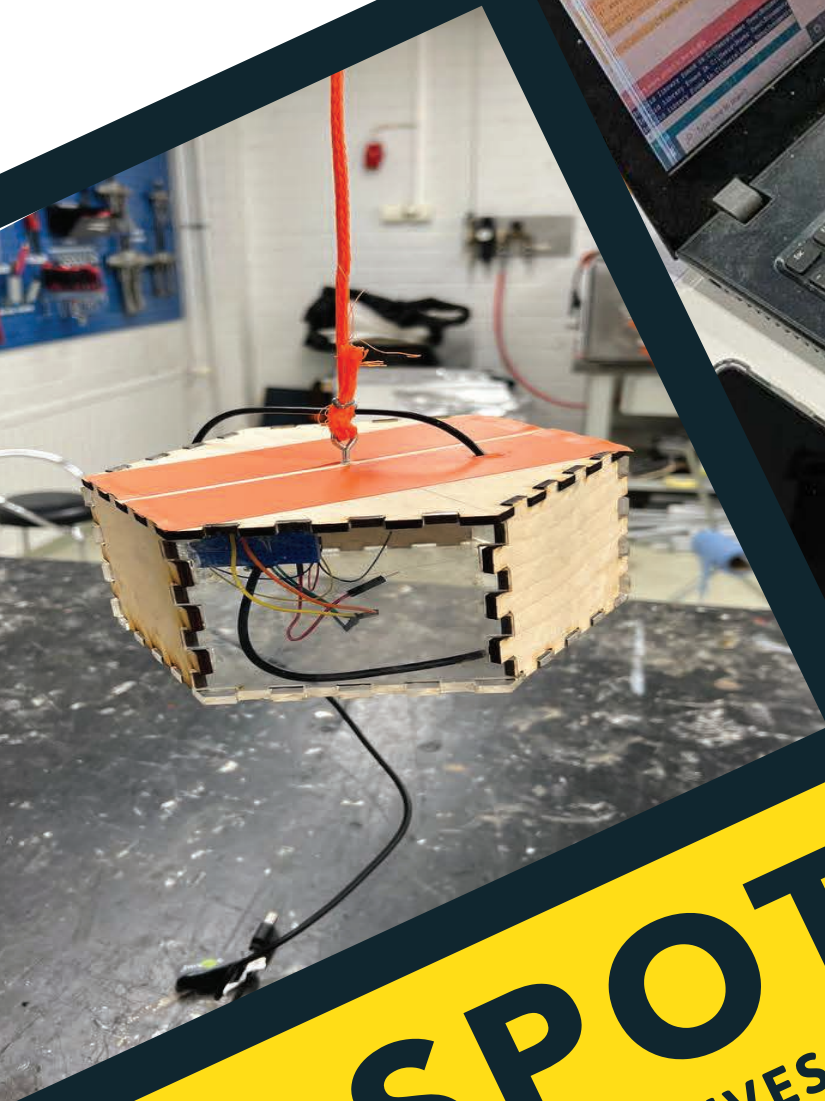Aalto University

TU Delft

DECEMBER 2022

SPOT

SOCIETAL PERSPECTIVES TO INNOVATION OPPORTUNITIES IN TECHNOLOGY

EXPLORING UNICORN DX STAKEHOLDERS

ATTRACT

Report:

STAKEHOLDER IDENTIFICATION AND MAPPING:
A student perspective

Prepared for:

UNICORN DX

Student projects completed within the course:
Mechanical Engineering in Society
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Student contributors:

This compilation of student perceptions was collated from the submissions of 23 students who opted to remain anonymous, and the following students who wanted to be acknowledged as contributors: Ekaterina Alifanova, Tobias Ekholm, Yelin Hou, Topi Laitinen, Vatsal Mandlesara, Ahmed Nasir, Wudith Niyagama Gamage, Fletcher Porter, Mikael Rosin, and Ari Vuorio.

Nature of student assignment:

Students were introduced to the Unicorn DX project through a course case study and the ATTRACT technology card. Keeping **sustainability** as a key consideration, students explored the possibility of using UNICORN DX in **extreme environments**. They were asked to critically consider the range of stakeholders that may be linked to the project as customers, suppliers, collaborators, supporters, and competitors. Students were also tasked with identifying inspirational connections to the project.

Top 10 key customers identified by students

- International marine logistics organisations.
- Universities with active marine and arctic research units.
- International charity organisations.
- Humanitarian organization in a crisis zone.
- Explorers.
- Military hospitals.
- Rescue teams.
- Shipping companies at a cargo ship.
- Patients.
- Insurance Companies.

People who need the most help live in very remote and sometimes extreme conditions and it's very hard to provide them with a full-functioning laboratory. Unicorn DX can help both the people charities are trying to reach as well as their own representatives to check their health to ensure everyone's safety.
Ekaterina Alifanova

Help is difficult to get in the middle of nowhere and possibly expensive. If someone got sick, the cause could be measured accurately with Unicorn DX. Then only the necessary medical supplies are shipped there, or it can be clarified if one needs a hospital. This way, possible waste of resources is minimized.
Engineering student

The machine could be useful in situations where there is limited access to healthcare and outside help. A prime example would be a shipping company. Crew safety is important to guarantee efficient vessel operation. If a crew member has symptoms of an illness during long voyages, it is important to treat the patient correctly to limit further complications.
Engineering student

The machine could also be used in crisis zones by a humanitarian organization. Healthcare workers might be hard to come by in demanding situations and the number of patients might be overwhelming. The machine can be brought to hard to access locations and be operated with limited training. The machine can aid the diagnostics procedure and help the humanitarian workers in demanding situations.
Engineering student

The UnicornDx detection system is unique in that it detects individual viral particles, allows for multimodal analysis of patient droplets, and communicates the results to relevant stakeholders. A more immediate benefit is that such a rapid and cost-effective test could help the healthcare system prepare for any future epidemics.
Yelin Hou

Top 10 key suppliers identified by students

- Suppliers of potentially recycled plastic appropriate for medical device manufacturing.
- Injection moulding specialists.
- Internal hardware supplier.
- Circuit board supplier.
- Software supplier.
- Cloud-network providers.
- Electronics manufacturers.
- Biochemistry specialists capable of developing registry of different bacteria and viruses.
- Services to support the advertising of the product.
- GUI supplier.

In addition to the functionality of the product, it is important to pay attention to how the product is marketed, so that it can be given the kind of image that the owners think is essential.
Engineering student

To provide for sharing of this information, cloud-network providers will need to find a way to take care of the latency issue so that people from remote areas with little signal coverage can also get access to this service.
Engineering student

Chip manufacturing is a highly specialized field and there are only a few companies in the world that can manufacture microchips. During pandemic, the global chip manufacturing has had constant supply problems.
Engineering student

Using a company as a supplier that uses recyclable and reusable plastics is a sustainable supplier. If the assembling of the product is taken place in a sustainable country, such as Finland, the supplier should be as near to the production unit as possible.
Engineering student

Use of a GUI o interact with the device is vital where input parameters along with metadata are fed to visualize test outputs.
Engineering student

Top 10 key collaborators identified by students

- Universities and researchers.
- Marketing specialists.
- Experienced and novice medical professionals.
- Designers.
- Patients.
- Hospitals
- Publicly run healthcare programs (Such as healthcare centers and regional clinics etc.)
- The material science department
- Nanosensor producers.
- NGOs.

Covid has shown the world the importance of the doctors, nurses and laboratory workers and that we might have been taking them for granted. Medical industry has taken a big hit during past few years and it is a great time to help to reform it, to lift the stress from the workers so they can do their best job. Unicorn DX will help medical professionals do their job better and faster and I am sure they would love it. It will not change the system upside down but instead, it will be a small step in the right direction.
Ekaterina Alifanova

New medical professionals are possibly not experts, which is a good reason to make the interface simple. Simple interfaces can increase the demand for the device because more people understand how to use it.
Engineering student

The nanosensor does the real analysis of the sample droplets and needs to have the ability to do testing also in extreme environments in order to make the Unicorn DX work there. Here the suppliers of these play and crucial role for the company because without exact results and test the device can't do the diagnosis correctly which is the core value of this product.
Engineering student

Relevant NGOs could contribute at all stages of the research cycle, fostering the relevance and effectiveness of the research, priority setting, and knowledge translation to action.
Engineering student

Top 10 key competitors identified by students

- Healthcare workers' unions.
- Companies/organisations focused on providing a cure.
- **Developers of successful vaccinations.**
- Existing medical technology companies.
- Existing medical device developers and manufacturers.
- Traditional testing laboratories.
- Private, for-profit medical institutions.
- Other medical device startups.
- Existing antigen test producers.

Following vaccination, a net of protection can be created by synergizing with the body's natural defense system, thereby reducing the risk of contracting the disease. This could potentially affect the role and influence of UnicornDX, as both aim to contribute to human health and safety
Yelin Hou

There are numerous established healthcare companies that have a wide portfolio of medical machinery and a lot of expertise and resources. These companies are, for example, Phillips healthcare, GE healthcare and Medtronic. These companies have established supply chains, customers, and knowledge in the field. These companies are also competing of the same employees as Unicorn DX.
Engineering student

The purpose of private medical centers is often to make a profit, so it can be assumed that they want to keep the range of traditional examinations even if such extensive health examinations can take a very long time.
Engineering student

Antigen testing kits, such as those produced by Arcadia, saw increased us with Covid-19. They provided, not exactly accurate results, but convenience and a level of accuracy that customers could accept. They would be one of the most challenging competitors as customers can bring kits with them everywhere even remote locations.
Engineering student

BMC Infectious Diseases research and machine about new, rapid, simple tests written in 2014. They have broken in to the extreme environments that Unicorn DX are trying for but the technology of testing is the same.

Engineering student

Key potential **blockers** identified by students

- Companies focused on finding and selling a cure.
- Governments and regulator institutions perpetuation a non-innovation mindset.
- Regulations and policy makers.
- Public perception of all-in-one lab devises.
- The healthcare workers who may feel their livelihood is threatened.

The all-in-one lab machines might have a bad reputation in some groups. The Silicon Valley company Theranos had quite a similar business idea with an all-in-one lab machine that worked from a small sample of blood from the patient. The company raised billions of dollars and was one of the most valuated companies in Silicon Valley. In the end their technology did not work, and they deceived their investors and the public. There is an ongoing criminal trial about the fraud of the company. This might have an enormous impact for the perception of the company for the investors and Unicorn DX claims quite similar thing as Theranos did.

Engineering student

The policymakers aggregate data from patients, providers, and payors to develop population-level metrics that inform their health and health economic policies, so they might be the progress blockers for Unicorn DX.Providers operationalize care delivery within the policy framework. They provide health services to patients and maintain health information about them. The providers coordinate patient care with other providers as care team members. Many providers are independent businesses that must manage their own operations and finances.

Engineering student

Key **supporters** identified by students

- Private financiers or invertors.
- Government agencies that provide funding to innovations within the healthcare domain.
- Government agencies that provide funding to innovative technology solutions.
- Regulatory bodies that approve the device for use.
- Business associations
- Medical schools and university medical hospitals.
- Defense forces
- Doctors without Borders and other mobile medical repones services.
- European Centers for Disease Prevention and Control

Medical schools could support the development by educating future medical professional about the machine and the use of it. Governments could support the development in order to avoid future pandemics.
Engineering student

Does the device function in such a way that its results remain the same when the conditions change, and does it remain operational in extreme conditions? The medical personnel of the defense force could benefit from duce a device and could potentially support the further development.
Engineering student

After the pandemic, institution such as ECDC are quite active for supporting such a venture. The product enables large population for better healthcare. The data stored at Unicorn can help ECDC monitor the situations around the Europe. It will be one of the big supporters.
Engineering student

One of the key supporters could be local and national government sbecause they have reasonable financial resources. It is in their best interest to reduce the spread of infectious diseases – as the case of COVID-19 has shown, a pandemic can have devastating economic effects.

Engineering student

Key organizations, people, and other considerations that may **inspire** the team at UNICORN DX Inspiration

- The size, weight and functionality of equipment designed to be used in space.
- Nature. In terms of shape or functionality, nature has something to offer.
- Sports watch adaptation and the rise of personal wellbeing monitoring.

- Established medical companies (Phillips healthcare, GE healthcare etc.)
- BMC Infectious Diseases research
- COVID-19

The publics adaptation of sports watches could be seen inspirational for Unicorn DX. It is a growing trend that we want to know more about our body and the state of our health. The Unicorn DX machine can provide up to date information about the state of the patient's health. The public has grown more interested in health in the past years and this change of perception and interest in our health could be seen as inspirational. People want to know more about their selves and Unicorn DX could provide that if it succeeds in creating the perception of a health company.

Engineering student

When the diagnosing process is made faster the customer experience might improve substantially for the patient. Instant knowledge with an examination will make the patient more confidante and hopefully more satisfied with the care. Even if the diagnostics of the machine would conclude that the illness is something minor and it will go away by itself, it might improve the satisfaction of the treatment by just giving concreate information to the patient about their condition.

Engineering student

The Covid pandemic has inspired an impressive wave of developments in healthcare. The pandemic is and has been a learning experience in the healthcare industry. When one considers the consequences of a single disease, you can certainly try to be inspired by it to avoid something similar in the future
Engineering student