

APPENDIX

Collaboration in healthcare:

Building effective transdisciplinary collaborations in open innovation initiatives

Master thesis
Regina Morán Reséndiz
July, 2020

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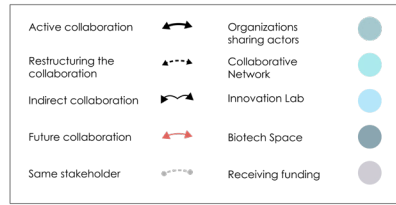
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Appendix B.
Stakeholder map of Dutch open innovation initiatives in healthcare

Appendix C.

List of barriers in open innovation initiatives in the Netherlands

Table C.1 Barriers at the ecosystem level in open innovation initiatives in the Netherlands

Ecosystem level		
Barrier	Representative quote	Description
Lacking space and tools	<i>'A problem for health care professionals is they see many challenges as well, but they don't have any tools or infrastructure where they can really push those challenges and also come up with solutions. Including them in the context is also changing their mindset.'</i> - Programme Developer at Innovation Lab	In the health context, lab space is often needed to realise experiments. The lack of space is often a barrier to develop a project. Besides, other resources, such as tools are also necessary.
Getting through health regulations	<i>'Sometimes, especially in healthcare projects, I see that it is really difficult [to develop technology] and that is because of law and regulations. It is really hard to get an innovation through all the tests and to really get it into the system.'</i> - Project Manager at Innovation Subsidy Programme)	Sometimes, the actors do not reach their goal of helping patients by developing new technology due to the health regulations. It is difficult to go through all the steps to get the development approved.
Trying to understand the hierarchy levels	<i>'And this is part of my thesis; you have to be politically correct to actually talk to people. So I first need to go to the ethic board here. And also the staff in the hospital, they are really nice, but they are really busy. It is sometimes difficult to approach them.'</i> - Master Student at Innovation Lab	The health context is perceived as hierarchical by the actors. Hence, being new or trying to move to a new working context has some challenges. For example, having the right contact or approaching the right person to be able to develop a project.

Table C.2 Barriers at the organisational level in open innovation initiatives in the Netherlands

Organisational level		
Barrier	Representative quote	Description
Lacking a collaborative structure	<i>'A problem for health care professionals is they see many challenges as well, but they don't have any tools or infrastructure where they can really push those challenges and also come up with solutions. Including them in the context is also changing their mindset.'</i> - Programme Developer at Innovation Lab	In some initiatives, individual work is encouraged over collaborative work due to the structure of the initiatives. Hence, actors do not have the means or motivation to develop group projects.
Unclear organisational purpose	<i>'But of course, the longevity of these labs also depends on the business case and sometimes it makes it quite difficult to define what the business case of these labs are.'</i> - Cardiologist at Collaborative Network	Open innovation initiatives in healthcare have increasingly emerged in recent years. Most of these initiatives have not achieved a level of maturity. They are still experimenting with their operations model and continuously questioning their purpose, which is sometimes confusing for the actors involved.

Table C.3 Barriers at the project level in open innovation initiatives in the Netherlands

Project level		
Barrier	Representative quote	Description
Not keeping it interesting for all	<i>'So it needs a lot of planning and also it is always difficult because every stakeholder has another interest. For example, for the company, their primary goal is to have new tubes. For the surgeon, he wants something to protect his hearing. He still wants to use the tools he is used to. But then, there is still the university who wants to publish a paper, for example. So sometimes, these things don't fit together; there are confidentiality problems. It is kind of political.'</i> - Master Student at Innovation Lab	Different interests are present in these transdisciplinary collaborations due to the diversity of stakeholders and actors involved. Often, those interests are not aligned, resulting in a conflict of interests.
Not having a clear project goal	<i>'I think for me the biggest challenge was that the brief was not clearly defined, so I have to spend my time defining what I wanted to do, what they wanted me to do, what Philips design wants me to do.'</i> - PhD researcher at Innovation Lab	Sometimes, actors do not have clarity of which is the goal of the project. Hence, they invest time on aligning the actors involved a defining a common goal.
Not having time available	<i>'The most challenging part is getting people together in the room. Obviously, healthcare workers have little to no time outside their regular jobs to be active in any type of project. What we try to do is have the meetings at the beginning of the day or at the end of the day. When the regular patient treatment is done, so that is the challenge.'</i> - Innovation Manager at Collaborative Network	Due to the nature of each role, actors have busy schedules, making it difficult to find a moment where everyone can gather. Besides, innovation needs time, because often experimentation is needed, so it is most likely the results will not be ideal the first time. They need to try out things, but time is scarce in the health sector.
Rotating actors	<i>'It is about connecting with people, and a lot of the time you see people changing from positions, and then, your contact is gone, and you have to start up again. That is really difficult.'</i> - Innovation Manager at Collaborative Network	Innovation process in healthcare is often slow. Sometimes, people change roles, and the other actors need to find new collaborators and starting again, making the process even slower.

Table C.4 Barriers at the actor level in open innovation initiatives in the Netherlands

Actor level		
Barrier	Representative quote	Description
Not letting go of discipline behaviours or attitudes	<i>'Also, from the people involved, it means that they have to let go of some behaviour or attitudes that they have as a scientist. And actually, start getting some skills that they need to actually move into clinical trials.'</i> - Chief Business Officer at Biotech Space	Each discipline has a particular way of working and follows its particular process. Hence, it is difficult for actors to understand different ways of working and learn from others.
Talking but not collaborating	<i>'Here it is like everyone has their own topic. They talk to each other and share knowledge but not really collaborating like writing together with a paper.'</i> - PhD researcher at Innovation Lab	Although actors interact with each other, they mainly interact to inform or give advice, but they do not have a joint project.
Having a different view of the world	<i>'A different view of the world. You speak a different language, you look at things completely different, with a different mindset. So you end up with the communication being the biggest problem, which is also the case with scientists and someone with a business mindset. What I believe personally is that you need to have those kinds of interactions to come with innovations and create a new way of thinking.'</i> - Chief Business Officer at Biotech Space	Actors from different disciplines have different ways of thinking and perceiving things. Hence, collaborating with multiple disciplines is often challenging due to the lack of understanding between disciplines and the difficulty to convey the right message.

Appendix D.

Description of enablers in open innovation initiatives in the Netherlands

Table D.1 Enablers at the organisational level in open innovation initiatives in the Netherlands

Organisational level			Assisting and creating events	<p>'Well, they are a lot of meetings about innovation, health care, vitality or stuff like that. So someone from my department is present, you meet people there. It goes on from there. Basically, the community is narrow down to one or two people who are responsible for that part of the community. So we invite these people to discuss what they are doing and whether they would like to collaborate.'</p> <p>- Cardiologist at Innovation Lab</p>	Realising events such as seminars or workshops is an excellent opportunity to expand the network, start new projects or find the right partner.
Enabler	Representative quote	Description			
Providing facilities and tools	<p>'Well, one is we provide space, labs, facilities to make sure these companies in the health sector have a place to actually do their job. No housing means no working.'</p> <p>- Director at Biotech Space</p>	Some initiatives are aware of the lack of space for clinical trials or technological development. Hence, they focus on providing space to different actors and stakeholders so they can develop their projects.	Sharing updates	<p>'I think that something important to do, we have an internal newsletter but we also have an external newsletter to make sure that politicians and the companies know what we are doing.'</p> <p>- Director of Biotech Space</p>	Providing everyone with information about the status of the projects allows actors to be updated and feel they belong to the project.
Having support during legal agreements	<p>'We are just the facilitators of the process. We are not the project owners, so to speak. The intellectual property is from the person initiating it and the people collaborating in the team.'</p> <p>- Programme Developer at Innovation Lab</p>	Being clear about who has the intellectual property and other legal aspects allow actors to focus on their tasks without investing extra time on legal aspects.	Building a collaborative network	<p>'We have been doing research in this field before, so we already have a quite extensive network with all kinds of healthcare organisations. And we collaborate with the University of Applied Science. They also have a very extensive network already with healthcare providers and also direct client organisations.'</p> <p>- Innovation Manager at Collaborative Network</p>	Building a network is an effort all initiatives consider worth it. It takes time; however, having an extensive network allows actors to find the right partner for each project. Also doors open to new possibilities.
Having clear roles and tasks	<p>'On the hand, we have the account management role of the innovation management in the Health Valley where we go out to a party, and we ask; "what do you want?"; "what is your need?"; "what is the specific challenge that you have?"; On the other side, we have the entrepreneurs that have some sort of ready-product, prototype or an idea, and they come to us and say. "Ok, I want to do something in healthcare. This is my idea, how can you help me get to the market?";'</p> <p>- Innovation Manager at Collaborative Network</p>	Being clear on everyone's roles and tasks facilitates the operations inside the initiatives.	Collaboration with external parties	<p>'Our department has frequent discussions with the community, with local health insurance companies to discuss innovation and health care.'</p> <p>- Cardiologist at Innovation Lab</p>	In some cases, the initiative responds to a local need; therefore, actors find it relevant to have communication with the local government or organisations that might play a role during the project.
Sharing a vision	<p>'The purpose of having a lab is doing research from different perspectives and having the same aim.'</p> <p>- PhD at Innovation Lab</p>	When different actors work towards the same aim and have the same vision, all efforts are aligned towards the same direction.			

Table D.2 Enablers at the project level in open innovation initiatives in the Netherlands

Project level		
Enabler	Representative quote	Description
Being open for experimentation	<i>"What is most intriguing is that of course, they had the first prototype. Is still not under regulations to be used by the hospital, but for her as a gynaecologist, she saw a new possibility."</i> - Programme Developer at Innovation Lab	Sometimes, there is not a clear path, or there are restrictions to move on. However, actors look for a way to keep on moving with the project through experimentation and by being open to new possibilities.
Breaking down the steps	<i>"Forget about what everyone's part is as an actor in this complex social network and just start the project and see what happens. That is sometimes an approach we use because rather than to make everything complicated since the beginning, you start and then see what you miss and add it."</i> - Cardiologist at Innovation Lab	Due to the complexity of the projects, breaking down the project into smaller phases allows actors to make adjustments and iterate when needed, instead of trying to solve a complex challenge where is difficult to know how to start.
Having an iterative process	<i>"So she started prototyping and participated twice. Also, she created several prototypes using digital fabrication and gave them to several people, users to tests. Now, she is iterating prototype number 20 or so; I lost the count."</i> - Programme Developer at Innovation Lab	Actors are aware that when tackling complex challenges, the process is not linear. Invariably they are moving back and forth iterating, to be able to find the right path.
Defining success metrics	<i>"It is important also to mention that another thing that NeLL does is to create quality standards for eHealth, we call it now a fast track for an individual product. We assess products using four different topics that I mentioned, the used of scientific evidence, use of anticipation? Legal-practical issues, and also the scaling potential. So we test a certain eHealth service. Then, we arrive a conclusion about the quality, either it does or does not receive the quality. Besides that, we also have an important contribution with the ISO norm that is being now created."</i> - PhD researcher at Collaborative Network	Some initiatives use the metrics defined by the organisation that provides the funding. However, metrics have helped initiatives to track their improvements and measure outcomes.
Selecting the right members	<i>"Yeah, the project I was mentioning, it is not only researchers from our side. There is a large consortium behind it. Informing of the project and validating the outcome about it, are both governmental organisations, the province, but also the association of people with a certain profession. In this case, the caseworkers that help people with autism, on the caregiving side. A lot of organisations that provide health to clients. So a lot of healthcare organisations are involved."</i> - Co-scientific Director at Innovation Lab	Actors want to collaborate with different stakeholders and people from different disciplines that can cover different roles and contribute with their perspective and experience.

Getting funding	<i>"We are a public-private partnership. There is public money coming from the provinces and private money coming from the partnerships that have a specific fee, and they pay us to do all these types of events, etc."</i> - Innovation Manager at Collaborative Network	Most of the projects receive money from the European Union and the government. In some case, that funding is complemented with their money or money from private organisations.
Having a collaborative process	<i>"What we try to do is to really involved them in project meetings and make those meetings more workshop-like. Let them experience the methodology and the tools we are developing. It is more of an experience than just communicating results. And the advantage of doing that is because we have such a diverse list of stakeholders within the consortium that when you put something tangible that they can really experience, it is easier to relate, no matter what your background is. Making your research concept tangible is really important."</i> - Co-scientific Director at Innovation Lab	In this type of initiatives, it is essential to include everyone related to the project. It is important to provide spaces where actors can share their perspective and learn from each other.
Delivering outcomes	<i>"The interesting thing is that four years later some of the projects have ended up in patients, and now they understand why we asked them to do that three years ago. So they are now the biggest advocates."</i> - Chief Business Officer at Biotech Space	Sometimes, it is until the other actors see the outcome when they really understand the value of the project.
Having periodical meetings	<i>"We have bi-monthly meetings, we have monthly meetings but then Veronica* presents one month and then I present the other, so for me, it is a bi-monthly. So I think this is the only official meeting."</i> - PhD Researcher at Innovation Lab *The name has been changed to respect the privacy of the actor	Periodical meetings are helpful to present the progress of the project, so everyone is aware of the status of the project.
Participating actively	<i>"What we try to do is to really involved them in project meetings and make those meetings more workshop-like. Let them experience the methodology and the tools we are developing. It is more of an experience than just communicating results. And the advantage of doing that is because we have such a diverse list of stakeholders within the consortium that when you put something tangible that they can really experience, it is easier to relate, no matter what your background is. Making your research concept tangible is really important"</i> - Co-scientific Director at Innovation Lab	Some actors look for different ways of working on getting everyone involved in the project; for example, instead of having regular meetings having working sessions. In that way, actors have a space to share their opinions and listened to others to increase their engagement in the project.

Table D.3 Enablers at the actor level in open innovation initiatives in the Netherlands

Actor level		
Enabler	Representative quote	Description
Having a common goal	<p><i>'It is a continuous balancing act. What I find that is important is that we make sure that we have the same shared values and the same shared insights about what we want to achieve in the end.'</i></p> <p>- Director at Biotech Space</p>	Actors in multiple disciplines teams work towards a common goal; they are moving in the same direction.
Including multiple perspectives	<p><i>'Yes, if it is only for the staff, that is not good for the patient, so it has to come both ways. Indeed, we do work for staff and patients. That is also one of the things we find very important.'</i></p> <p>- Director at Biotech Space</p>	Including perspectives from different actors results in a more fruitful process and better outcomes.
Having communication channels	<p><i>'I bring them in contact with each other, mostly by mail, and afterwards, we define a meeting place.'</i></p> <p>- Innovation Manager at Collaborative Network</p>	Having communication channels allow actors to feel free to contact others when needed, allowing a more organic and flexible collaboration.

Appendix E. Online survey shared with UIDT actors



Introducción

Investigación en la UIDT: Barreras y facilitadores

Como parte de mi proyecto de maestría en Diseño estratégico en la Universidad Tecnológica de Delft, realizo una investigación sobre colaboración transdisciplinaria en la UIDT (Unidad de Investigación y Desarrollo Tecnológico) de ICAT (Instituto de Ciencias Aplicadas y Tecnología) en el Hospital General de México "Dr. Eduardo Liceaga". En esta primera fase de mi investigación, realicé 15 entrevistas a médicos, académicos, investigadores y estudiantes. Después analicé cada una de las entrevistas con el objetivo de detectar las barreras (mecanismos que limitan las actividades) y facilitadores (mecanismos que permiten que las actividades se realicen) que están presentes en la UIDT. Clasifiqué las barreras y los facilitadores de acuerdo al nivel organizacional en el que se encuentran; los niveles son, organización, proyecto o actor. Como resultado, identifiqué 17 barreras y 26 facilitadores, que se encuentran en los siguientes niveles:

Organización	9	8
Proyecto	4	13
Actor	4	5

Abreviaciones y conceptos:

SN: Sistema Nacional de Investigadores

NA: No Aplica

HGMEL (Hospital General de México "Dr. Eduardo Liceaga")

Institución: UNAM o HGMEL (Hospital General de México "Dr. Eduardo Liceaga")

Actores: todos los miembros o colaboradores de la UIDT

Tomando como referencia tu experiencia como miembro o colaborador de la UIDT. Te invito a realizar la siguiente encuesta que dura alrededor de 15 minutos. La información que compartas no se va a publicar tampoco tu nombre. La información va a ser utilizada con el único fin de nutrir la investigación.

1.

¿Cuál es tu nombre y tu correo electrónico*?

**Únicamente con el fin de poder aclarar dudas en caso de ser necesario, tu nombre no va a ser publicado o compartido con otras personas.*

2. **¿Cuál es o fue tu función en la UIDT?**

3.

¿Consideras que las siguientes barreras limitan o limitaron tus actividades con otros actores de la UIDT?

	Nivel: Actor					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
No conocer el trabajo de los demás limita nuestra colaboración <i>Actores de otras disciplinas esperan que entregue resultados inmediatos; no entienden lo que hago</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La falta de comunicación con los demás no me permite colaborar efectivamente <i>La falta de comunicación ocasiona momentos de confusión durante el desarrollo del proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mi conversación con otros es únicamente para informar algo, no para colaborar <i>Nos comunicamos con el objetivo de compartir información; cada quien trabaja en su proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Nivel: Actor					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Apegarme a las actitudes y los comportamientos propios de mi disciplina limita mi colaboración con los demás <i>Al trabajar con otras disciplinas es difícil entender la forma de trabajar y estar abierto a aprender</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4.

¿Consideras que las siguientes barreras limitan o limitaron tus actividades para el desarrollo de tu proyecto dentro de la UIDT?

	Nivel: Proyecto					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
La falta de claridad en la meta del proyecto limita el desarrollo del mismo <i>La complejidad del proyecto ocasiona que sea difícil definir metas claras desde el inicio del proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Nivel: Proyecto					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
La falta de tiempo en mi trabajo o estudios limita el desarrollo de mi proyecto <i>Cuento con poco tiempo disponible para dedicarlo al proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Nivel: Proyecto					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
No colaborar con los actores indicados limita el desarrollo de mi proyecto <i>En el equipo hay ciertos roles o disciplinas que aún no están cubiertos</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
El proceso para obtener el protocolo aprobado limita el desarrollo de mi proyecto <i>El proceso para autorización es largo y requiere de mucho papeleo</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

COLLABORATION IN HEALTHCARE

5.

¿Consideras que las siguientes barreras limitan o limitaron tus actividades como miembro o colaborador de la UIDT?

	Nivel: Organización					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
La falta de claridad en el propósito de la UIDT limita mis actividades dentro de la unidad <i>La atención se centra en el investigador y no en el tema de estudio, entonces se pierde el propósito de la unidad</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La falta de recursos para proyectos limita mis actividades en la UIDT <i>No hay un presupuesto definido para desarrollar proyectos</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La falta de espacio y de herramientas limita mis actividades en la UIDT <i>El espacio no es suficiente para trabajar varios proyectos al mismo tiempo y el equipo es limitado</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La falta de sentido de comunidad entre los actores de la UIDT limita mis actividades <i>Los miembros y colaboradores de la unidad no nos identificamos como una comunidad</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Nivel: Organización					
	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
La demanda de publicaciones constantes y las evaluaciones por parte de la institución limita mis actividades en la UIDT <i>Mi reto es mantener el número de publicaciones de acuerdo con el SNI y al mismo tiempo desarrollar tecnología junto con el hospital</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La alta carga de trabajo en la institución (UNAM o HGMEI), limita mi contribución a la UIDT <i>Tengo otras responsabilidades que me impide enfocarme al 100% en la UIDT</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La falta de visibilidad de todos los proyectos activos limita mis actividades en la UIDT <i>Cada uno trabaja en sus propios proyectos y la UIDT no tiene visibilidad del estado de cada proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Organización

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
La falta de apoyo organizacional limita mis actividades como colaborador de la UIDT <i>No hay claridad de cómo la UIDT me puede brindar apoyo para desarrollar mis proyectos</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La desigualdad de poder entre las diferentes disciplinas o puestos limita mis actividades en la UIDT <i>En ocasiones, las ideas se implementan sin dar lugar para negociar o cuestionar</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6.

¿Consideras que los siguientes facilitadores te benefician o beneficiaron para colaborar con los demás miembros de la UIDT?

Nivel: Actor

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Actor

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Mi compromiso personal con la UIDT beneficia mi colaboración con los demás <i>Debido a la falta de apoyo organizacional, los proyectos se desarrollan gracias al compromiso personal y esfuerzo de cada uno de los actores</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Definir canales de comunicación beneficia mi colaboración con los demás <i>Tener canales de comunicación definidos ayuda a que todos estemos actualizados durante el proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estar abierto a aprender de los demás beneficia mi colaboración ellos <i>Escuchar a los demás me permite aprender y cuestionar mis procesos</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Ser autodidacta beneficia mi colaboración con otros actores de la UIDT <i>En ocasiones, me falta el apoyo de alguna disciplina, por lo que investigo y aprendo por mi cuenta para resolver el problema</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Actor

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
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Saber cómo convencer a los demás contribuye a mejorar la colaboración
Saber cómo convencer a los demás me ayuda a lograr que las cosas sucedan

7.

¿Consideras que los siguientes facilitadores beneficiaron o benefician el desarrollo de tus proyectos dentro de la UIDT?

Nivel: Proyecto

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Entregar resultados y mostrarlos a los demás beneficia al proyecto <i>Ver un desarrollo tecnológico que tenga impacto en el paciente o un artículo publicado contribuyen visibilizar el valor de la UIDT</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Proyecto

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
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Dividir el proyecto en etapas beneficia el desarrollo del mismo
Al trabajar proyectos complejos, resulta más efectivo dividir el proyecto en etapas y hacer ajustes sobre la marcha

Trabajar con los actores indicados beneficia el desarrollo de mi proyecto
El proyecto sale adelante si tenemos a los actores necesarios para cubrir cada una de las funciones que se requieren

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Compartir conocimientos y habilidades entre los actores del proyecto beneficia el desarrollo del mismo
Los actores de la UIDT tenemos diferentes formación; por lo tanto, es útil compartir conocimientos para entendernos mejor

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Tener reuniones periódicas beneficia el desarrollo de mi proyecto
Las reuniones periódicas ayudan a conocer el progreso del proyecto y a que todos puedan contribuir de igual manera

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Neutral NA

Nivel: Proyecto

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Obtener recursos externos me ayudó a poder desarrollar el proyecto <i>Gracias a los recursos obtenidos pude comprar equipo para llevar a cabo el proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incluir las diferentes perspectivas de los actores beneficia el desarrollo del proyecto <i>Trabajar con varias disciplinas permite que cada uno cuestione desde su disciplina, y así, se genere conocimiento nuevo y más enriquecedor</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implementar un proceso iterativo beneficia el desarrollo del proyecto <i>Las retroalimentaciones constantes permiten hacer ajustes para obtener mejores resultados</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estar abiertos para experimentar beneficia el desarrollo de mi proyecto <i>Cuando no hay claridad sobre cómo abarcar el problema, funciona hacer pequeños experimentos para evaluar qué camino es el más viable</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Proyecto

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Trabajar con personas y casos reales me ha ayudado a diseñar soluciones más acertadas y adecuadas para los pacientes <i>Trabajar con personas en lugar de únicamente con modelos ha cambiado mi panorama por completo</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La claridad en actividades y roles beneficia el desarrollo de mi proyecto <i>La claridad me ayuda a trabajar de manera más efectiva en el proyecto</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implementar un proceso colaborativo beneficia el desarrollo del proyecto <i>Durante el proyecto, nos ayudamos unos a otros, compartimos responsabilidades y todos tenemos la libertad de aportar al mismo</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Proyecto

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
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Empatar las necesidades de los actores involucrados en el proyecto beneficia el desarrollo del mismo
Escuchar las necesidades de los demás ayuda a mantenernos alineados durante el proyecto

8.

¿Consideras que los siguientes facilitadores te benefician o beneficiaron para el desarrollo de tus actividades como miembro o colaborador de la UIDT?

Nivel: Organización

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Contar con espacio dentro del hospital beneficia mis actividades dentro de la UIDT <i>Una fortaleza de la UIDT es el espacio físico dentro del hospital</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Nivel: Organización

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
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Construir una red de colaboración beneficia mi participación dentro de la UIDT
Estar en contacto directo con actores del ICAT y el hospital me abre las puertas para nuevos proyectos

Contar con apoyo para realizar acuerdos legales beneficia mis actividades dentro de la UIDT
Para los procesos legales, obtengo el apoyo de la unidad de Vinculación y gestión

	Totalmente en desacuerdo	En desacuerdo	Neutral	De acuerdo	Totalmente de acuerdo	NA
Asistir y realizar seminarios, beneficia mis actividades dentro de la UIDT <i>Los seminarios realizados por la UIDT fueron el inicio de algunos de mis proyectos</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La equidad que existe entre instituciones (HGME e ICAT) beneficia mis actividades dentro de la UIDT <i>Considero que el hospital y el ICAT tienen el mismo peso en la toma de decisiones</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. ¿Cuál crees que podría o debería ser tu función como colaborador de la UIDT en una situación de pandemia como la que estamos viviendo?

Appendix F. Results from the survey

Grouping	Category	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	NA	Total	
Barrier: actor level	Lacking communication with others	21%	14%	21%	21%	21%		100%	
	Attaching to attitudes and behaviours of my discipline	50%	21%		14%	14%		100%	
	Talking to others is mainly to inform	21%	36%	21%	7%	14%		100%	
	Not knowing others	7%	29%	21%	29%	14%		100%	
Barrier: project level	The process to get the protocol approved		21%	21%	29%	7%	21%	100%	
	Lack of time in my work or my studies	14%	21%	14%	36%	7%	7%	100%	
	Not collaborating with the right actors	7%	21%	7%	43%	14%	7%	100%	
	Lacking clarity on the project's goal	14%	21%	7%	29%	14%	14%	100%	
Barrier: organization level	Having a high workload demand	7%	43%	14%	14%	14%	7%	100%	
	Lacking sense of community		29%	7%	36%	21%	7%	100%	
	Lacking institutional support	7%	7%	36%	21%	14%	14%	100%	
	Lacking space and tools	14%	21%	14%	29%	14%	7%	100%	
	Constant demand to publish and evaluations	21%	29%		21%		29%	100%	
	Lacking clarity in the UIDT purpose	14%	29%	7%	21%	14%	14%	100%	
	Power inequality between disciplines or roles	7%	29%	36%			7%	21%	100%
	Lacking resources for project development	7%	21%	7%	21%	36%	7%	100%	
	Lacking visibility of the status of the projects	7%	36%	21%	21%		7%	7%	100%
Enabler: actor level	Defining communication channels				50%	50%		100%	
	Being open to learn from others				21%	79%		100%	
	Being self-taught		7%	7%	43%	36%	7%	100%	
	My personal commitment			7%	36%	57%		100%	
	Knowing how to convince others		7%	29%	29%	36%		100%	

Enabler: project level	Working with the right actors			14%	29%	50%	7%	100%
	Sharing knowledge and abilities			7%	21%	64%	7%	100%
	Delivering results and sharing with others				21%	71%	7%	100%
	Clarity on activities and roles				57%	36%	7%	100%
	Having periodical meetings				43%	57%		100%
	Including different perspectives from actors				29%	71%		100%
	Splitting the project into phases				21%	71%	7%	100%
	Being open for experimentation				43%	50%	7%	100%
	Implementing an iterative process				43%	57%		100%
	Implementing a collaborative process		7%	14%	14%	57%	7%	100%
	Matching actors' needs				50%	43%	7%	100%
	Getting external resources			29%	21%	36%	14%	100%
	Working with people and real cases				21%	64%	14%	100%
Enabler: organizational level	Building a collaborative network				43%	57%		100%
	Having a physical space in the hospital		7%	29%	7%	57%		100%
	Assisting and realizing seminars		7%	14%	50%	21%	7%	100%
	Having support to realize legal agreements			21%	36%	29%	14%	100%
	Having equity between institutions(HGMEL and ICAT)	7%	14%	29%	29%	7%	14%	100%

Table F.1 Results from survey

Appendix G. Description of barriers at UIDT

Table G.1 Barriers at the ecosystem level in open innovation initiatives in the Netherlands

Ecosystem level		
Barrier	Representative quote	Description
National evaluations demanding short-term results	<i>'In recent years, we are suffering a very terrible neoliberalism in the academy. All the time, we are evaluating ourselves. The academy now is about self-evaluating and evaluating everyone, and the human aspect is lost. It is difficult to carry out long-term projects because what is important is the evaluation that is coming next month.'</i> - Full Researcher at ICAT	The National Evaluation System (from Spanish) demands constant evaluations. As a result, researchers focus on short-term projects that can be evaluated immediately instead of working on long-term projects.
Innovations are not reaching the patient	<i>'At the end of every project, I have the feeling that it does generate knowledge and demonstrates the capabilities on both sides [UIDT and HGMEI] and our needs are met. But it doesn't necessarily result in a benefit for what it was originally created, to contribute to a better society.'</i> - Full Researcher at ICAT	Due to the number of regulations by the Federal Commission for Protection against Health Risks (COFEPRIS from Spanish), in most of the cases, the technological development does not reach the patient.
Lacking recognition to scientists	<i>'A problem in Mexico is the social communication of science. If we were better at it, maybe more people would know what we are doing. And it could be important; for instance, now the virus [COVID-19] arrives, and people do not believe scientists. It is a waste because besides communicating the things that have to be done, we have to communicate the things that are a lie. That happens if there is never communication with people.'</i> - Full Professor at ICAT	There is no communication between scientists and citizens. Therefore, in the current situation caused by COVID-19, citizens do not easily understand scientists' messages.
Missing resources	<i>'The university is not designed to produce implants. The hospital produces them with their resources, but it requires more investment to have the complete production chain inside the hospital. However, it will not happen because they need respirators, syringes, etc.'</i> - Full Researcher at ICAT	The hospital does not have enough resources. Hence, they cannot invest in technology if they cannot cover some basic needs like buying syringes.

Focusing on international trends over local needs	<i>'But that [local problems] will not give you citations. If I solve a local problem, I will not get any citations, and I need citations to get promoted. Do I want citations?, then I need to publish about trend problems [...].'</i> - Full Professor at ICAT	Researchers' evaluations are based on the number of articles published. Hence, researchers focus on international trends to get their projects accepted in recognised journals. As a result, local needs are not being covered.
Depending on federal legislation to be approved	<i>'The cannabis regulation is under process at the Senate. We hope it will be defined soon. Otherwise, we cannot work.'</i> - Full Researcher at HGMEI	When researchers try to experiment to innovate, sometimes they face regulations that limit their research; for instance, the approval of cannabis for medical purposes.

Table G.2 Barriers at the organization level in open innovation initiatives in the Netherlands

Organisation level		
Barrier	Representative quote	Description
Having a heavy workload	<i>'For example, the contact with patients, managing the nurse system, the contact with clinicians; all that work needs to be done by us. And that sometimes results in a less efficient development [of the project].'</i> - Full Professor at ICAT	Actors have other responsibilities that do not allow them to focus on UIDT tasks entirely.
Lacking a sense of community	<i>'We, as researchers, tend to forget that we are a research community. The UIDT is not helping to encourage this sense of community, and it works individually according to each researcher.'</i> - Full Professor at ICAT	Members and collaborators at the UIDT do not see themselves as a community.
Lacking organisational support	<i>'I identify a problem that could be the umbrella under which you can find other problems. Furthermore, it is the lack of institutional recognition. [...] This unit was formed to be acknowledged by both institutions, but the truth is that there is not a follow-up from ICAT and HGMEI. If there would be institutional recognition, we could have bigger projects where each researcher could tackle from a different perspective. Nevertheless, that does not happen; the projects are individual.'</i> - Full Researcher at ICAT	It is not clear for the actors at the UIDT how the organisation can provide support for project development.
Missing facilities and tools for everyone	<i>'We don't have space to take the images. They require specific conditions. At this moment, there are other active projects, so let's say space is not enough. The space at the UIDT is not enough for everyone working at the same time.'</i> - Master Student at ICAT	Space is not enough to work on several projects at the same time, and the equipment is limited.
Contradiction between what has been asked from actors and how they are evaluated	<i>'You could tell, "I have a great project that could save some lives!". Direction would think, "But you don't get paid for that, I pay you to publish".'</i> / Full Researcher at ICAT	Researchers need to balance between maintaining the number of publications demanded and developing technology with the hospital.

Unclear organisational purpose	<i>'The problem is the UIDT centres the attention around me as a researcher. [...] but what is important is the study itself. You don't have to be central. Talking about specific people affects the UIDT.'</i> - Full Professor at ICAT	The attention focuses on the researchers instead of focusing on what is necessary, the cause or problem being studied.
Unequal power among	<i>'Certain ideas are imposed, and there is no space to negotiate, to express an opinion, or to contribute.'</i>	Sometimes, ideas are implemented without
Lacking project funding	<i>'It depends on the budget that the research groups have. I understand there is an established budget, but it is what a researcher receives per year. Then, that is not enough because the needs are bigger.'</i> - Full Researcher at ICAT	Actors perceive an established budget that is assigned to the projects but often that is not enough.
Lacking projects' overview	<i>'There are no project books; we do not know the progress of each protocol. When you ask researchers, they say, "You do not know, but we know". The problem is the organisation does not know either, so it should go beyond the personal knowledge of researchers.'</i> - Full Professor at ICAT	Everyone works on their projects, and the UIDT has no visibility of the status of each project.

Table G.3 Barriers at the project level in open innovation initiatives in the Netherlands

Project Level		
Barrier	Representative quote	Description
Getting the protocol approved by the committee	<i>'I already have two years with this [project]. The physician already submitted the protocol to the ethics board. They questioned some things, and the physician solved it. But I didn't make the submission, she [the physician] did. So now, I am dependent on her availability.'</i> - Full Researcher at ICAT)	The process to get a project approved by the hospital is long and requires a lot of paperwork.
Not having available time	<i>'The main support is the students, [...] who end up being your collaborators. However, students come and go; you cannot have a student forever developing a product for three years. Unless they are doing their PhD, however, PhDs deliverables are not specifically technological developments.'</i> - Full Researcher at ICAT	Actors have limited time to focus on their projects at UIDT.
Missing the right members	<i>'We don't have salespeople, someone who goes and offers projects to bring money back, defining working teams, allowing them to have time and money to be focused on that. But the system does not allow it.'</i> - Full Professor at ICAT	Although projects are usually collaboratively, still some roles are not being covered yet; for instance, a salesperson or a manager.
Not having a clear project goal	<i>'Maybe we missed defining the goals and deliverables. Throughout the meetings and visits to the hospital, we were able to understand what was needed because it was not that clear. I think we missed the definition in this case.'</i> - Full Professor at CIDJ	It is difficult to define clear goals at the beginning of the project due to its complexity.

Table G.4 Barriers at the actor level in open innovation initiatives in the Netherlands

Actor Level		
Barrier	Representative quote	Description
Missing communication	<i>'Something what could have improved is to have direct communication with everyone and not be dependent on others.'</i> - Bachelor Student at CIDJ	Lack of communication confuses and affects the project.
Attaching to discipline behaviours or attitudes	<i>'There are different ways of working in science, and when you want to apply them to other areas, some people say "why do you want to do it like that?" Then, you need to be clear because we all share the scientific method, but there are small variations and interpretations. Furthermore, that is why we need to be careful in the way we communicate and measure results.'</i> - Full Professor at ICAT	It is challenging trying to understand the way of working in other disciplines and being open to learning.
Talking but not collaborating	<i>'There were some intentions to try to coordinate that, "you use the space some days and I will use it the other days". Nevertheless, we did not get to an agreement.'</i> - Full Professor at ICAT	Actors communicate with each other to inform, not necessarily to collaborate
Not knowing the others' work	<i>'You need to know them [physicians], and they need to know us [scientists] to be able to work together. Because [at the beginning] the physicians were asking things as if we were technicians that could have things ready for the next day.'</i> - Full Researcher at HGMEJ	Actors from one discipline expect the other actors to deliver results immediately; they do not understand what each discipline is doing.

Appendix H. Description of enablers at UIDT

Table H.1 Barriers at the organisation level in open innovation initiatives in the Netherlands

Organisation Level		
Enablers	Representative quote	Description
Building a collaborative network	<i>'So the physicians gather and we tell them, "this is what we are doing, this could also be useful in another area". So they began to think about the possibilities. It is like a snowball effect, so a lot is based on recommendations.'</i> - Full Researcher at ICAT	Being always in contact with people from the hospital and the ICAT opens doors to new projects.
Providing facilities	<i>'The biggest strength that the UIDT has is access to biological samples and hospital laboratories.'</i> - Master Student at ICAT	A strength of the UIDT is the physical space inside the hospital.
Assisting and organising seminars	<i>'It was at the seminars organised, where the hospital and us presented our capabilities. We found the need and the possibility of a technological solution. That is what triggered this project and some other projects we began to work on.'</i> - Full Researcher at ICAT	The seminars realised by the UIDT were the beginning of some projects and a meeting point for physicians and researchers.
Having support during legal agreements	<i>'We do it with the support of another unit. When we know the product is working, we collaborate with the unit of Linkage and Management from the ICAT. They support us in the process for intellectual property and technology transfer.'</i> - Full Researcher at ICAT	The actors at UIDT have support when legal processes are needed.
Defining equity between institutions	<i>'On 2013, an Amending Agreement was defined. Its purpose was to have equity between both institutions, UNAM and HGMEL. Meaning they have the same weight in the UIDT.'</i> - Full Researcher at HGMEL	The hospital and the ICAT are equally capable of making decisions regarding the UIDT.

Table H.2 Barriers at the project level in open innovation initiatives in the Netherlands (first part)

Project Level		
Barrier	Representative quote	Description
Selecting the right members	<i>'We have big working tables, around ten main researchers who have been involved since the beginning of the project. That turns everything to be more modulated, avoiding one person wanting to cover more areas. And we also begin to absorb the knowledge from other areas and start implementing it in our scientific philosophy.'</i> - Full Professor at ICAT	The actors can develop a project effectively when the right members are involved in covering all the different roles needed.
Sharing knowledge and capabilities	<i>'What was interesting is that we, the designers, also took lectures with physicians. It was a short lecture to understand diabetic pathology, the symptoms and the implications. Based on these, we were able to make informed decisions and avoid suggesting things that could affect the patient.'</i> - Bachelor Student at CIDI	Sharing their discipline knowledge is necessary to have a better understanding of the actors involved.
Delivering outcomes	<i>'And the more success stories there are, the more the trust is generating and increasing.'</i> - Full Researcher at ICAT)	Seeing a technological development used by a patient or a paper published helps perceive the value of the UIDT.
Having clear roles and tasks	<i>'I think the greater success was the way roles were defined. I mean, the resident physician realised the task of looking for patients accurately. And to be in control of their clinical history in a proper way.'</i> - Master Student at ICAT	Defining clear roles help actors to be more effective in the project
Having periodical meetings	<i>'We met once a week to present the progress, the concepts and the prototypes. The best part was that the four of us were present in these sessions and we complemented each other. So we shared many ideas and then discarded them based on the requirements.'</i> - Bachelor Student at CIDI	Having periodical meetings allows all the actors to be updated about the progress and contribute to the project.
Considering multiple actors' perspectives	<i>'Transdisciplinarity has been useful, we sit down and discuss, and everyone forgets about their degree and their experience and only shares their speciality.'</i> - Full Professor at ICAT	Working with different disciplines allows actors to question their way of working; hence, they form new knowledge.

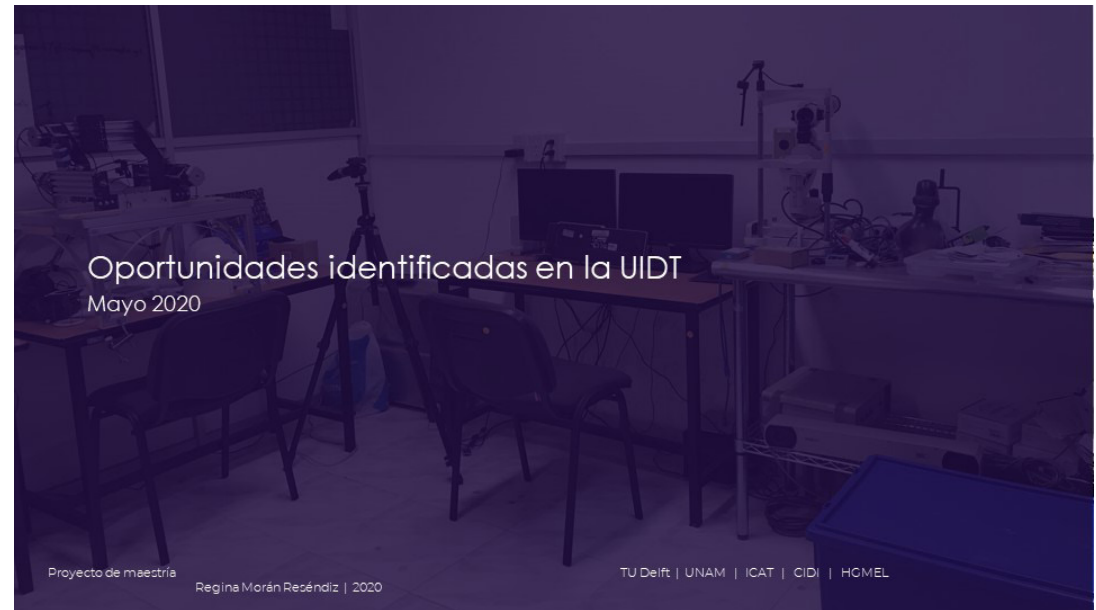
Table H.2 Barriers at the project level in open innovation initiatives in the Netherlands (part two)

Breaking down the steps of the project	<i>'We are interacting with people from different disciplines, so more than defining the whole project; we begin by defining small short-term goals. Based on that result, we define mid-term goals, and that is how we end up developing a project.'</i> - Full Researcher at ICAT	While working in complex projects, it is more effective to split the plan into smaller tasks and make adjustments when necessary.
Being open for experimentation	<i>'We explored our capabilities; we explored if it was feasible to launch a first run, we talked to them and executed the first trial. Based on that result, in the short-term phase, we developed a mid-term strategy.'</i> - Full Researcher at ICAT	When there is not a clear way to solve the problem, creating small experiments can help evaluate the most feasible path.
Having an iterative process	<i>'I was constantly talking to the resident and the physician to see what could be improved. The protocol began one way, and after a month or so, we made some adjustments based on the feedback given. I believe that the synergy between what they told us and our work contributed to achieving good results.'</i> - Master Student at ICAT	Constant feedback allows adjustments that can improve the project.
Having a collaborative process	<i>'No one is the boss. They [researchers] have projects and suggest, and also people from the hospital suggest, and they start working together.'</i> - Master Student at ICAT	Working with others allows actors to help each other when needed and share responsibilities. Besides, everyone is free to contribute to the project.
Matching actors' needs	<i>'First, listening to the hospital needs and then suggesting which are the technological or technical possibilities we could offer.'</i> - Full Researcher at ICAT	Listening to the others' needs contributes to having a better alignment throughout the project.
Getting resources for project development	<i>'If I had not won that call [from CONACYT], I think it would have been tough to stay in the hospital.'</i> - Full Researcher at HGMEL	Due to external resources obtained, actors can buy the equipment necessary to develop the project.
Working with real cases and people	<i>'I had to go into surgery to see the samples I was going to get [...], and I went in with a student. It changed my perception completely; it has nothing to do with what you do in a lab. First, it was impressive to see how they put the piece in and out. Later, when they gave us the piece, it was not a cone shape. How can I explain! It was like a cutlet, and some have more fat, less fat depending on the size. So it was good that I saw it because I had to make adjustments based on the type of piece I would receive.'</i> - Full Researcher at HGMEL	Working with real people instead of models changes the actors perspective allowing them to be more accurate when defining the experiments.

Table H.3 Barriers at the actor level in open innovation initiatives in the Netherlands

Actor Level		
Barrier	Representative quote	Description
Defining communication channels	<i>'The fastest way is by phone; it could be a message or a call. If there is a need to send information in a professional way, or book something, it could be via email.'</i> - Master Student at ICAT)	Having clear communication channels allows everyone to be updated regarding the project.
Acquiring knowledge from others	<i>'By talking to the patient and other researchers, you also learn others' philosophies, and you absorb that information to apply it in other areas. So then, you also change the way you structure yourself as a scientist, and you begin to notice how functionalities from different areas can guide your approach.'</i> - Full Professor at ICAT	Listening to other disciplines allows actors to reflect and question their processes.
Self-learning	<i>'[To understand], I read a lot. It was my initiative. In the end, it is my problem because it is my topic. Therefore, no one will let me know what I am missing.'</i> - Master Student at ICAT	When the actors are not able to collaborate with one discipline, they decide to study and learn by themselves to solve the problem.
Being committed to the UIDT	<i>'I think for every project, no matter the size, it is an agreement from actors regarding their willingness to participate.'</i> - Full Researcher at ICAT	According to the actors, the projects develop due to the commitment and the effort of each actor. Not due to organisational support.
Convincing others	<i>'If you do not have the power to convince others, you will not be able to make things happen. Furthermore, the physician told me, "You are here because you know how to convince others". So I applied it to help others. I convinced a physician to work with a colleague.'</i> - Full Researcher at HGMEL	Knowing how to convince others helps actors to make things happen.

Appendix I.
Booklet for co-creative sessions
(in Spanish)



OBJETIVO





Presentar las 4 oportunidades
definidas para contribuir a la UIDT.

INSTRUCCIONES*

Lee cada una de las propuestas presentadas y responde las preguntas en las diapositivas 4-8. Duración: 15 min.

* Busca los títulos color naranja


Oportunidades

<p>Oportunidad 1</p> <p>Construir una red de colaboración entre los actores de la UIDT</p> 	<p>Oportunidad 2</p> <p>Estar actualizados sobre el estatus de los proyectos y el futuro de la UIDT</p> 	<p>Oportunidad 3</p> <p>Compartir conocimientos y aprender de otros para obtener mejores resultados en los proyectos</p> 	<p>Oportunidad 4</p> <p>Apoyo entre los actores para mantenerse comprometidos con los proyectos</p> 
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Proyecto de maestría

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1 Construir una red de colaboración entre los actores de la UIDT

DESCRIPCIÓN
Construir una estructura que facilite la colaboración entre actores para el desarrollo de proyectos.

“Como no hay proyectos en común, no tenemos sentimiento de comunidad. No hay la estructura de ir luchando por algo en específico”
- Investigador Titular

ESCRIBETU RESPUESTA

1 ¿Cuál es tu opinión acerca de esta oportunidad?

2 ¿Cómo podrías construir una red de colaboración?

3 ¿Otro comentario?

Necesidades de los actores de la UIDT:

- Colaborar con otros investigadores dentro de la misma institución
- Sentimiento de comunidad entre los integrantes de la UIDT
- Contactar a otros actores para desarrollar proyectos en conjunto

Fundamentación:

- Definir estructuras y procesos de colaboración es necesario para alcanzar una innovación sostenible dentro de una organización (Dougherty & Hardy, 1996)
- La existencia de una comunidad depende de 4 factores: miembros, estructura compartida, propósito colectivo y límites (van Zuthem, 2014)

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2

Estar actualizados sobre el estatus de los proyectos y el futuro de la UIDT

DESCRIPCIÓN
Involucrar a los actores en el desarrollo de los proyectos y tener una visión general de la actividad en la UIDT.

“Había una reunión mensual en la cual se veían los avances, los protocolos de investigación, nuevas ideas que podrían surgir que le darían forma a nuevos proyectos”

- Técnico Académico Titular

Necesidades de los actores de la UIDT:

- Compartir los avances del proyecto
- Dar y recibir retroalimentación sobre los avances del proyecto
- Tomar decisiones y hacer los ajustes necesarios
- Proponer y definir nuevos proyectos
- Conocer los planes a futuro de la UIDT

Proyecto de maestría

Fundamentación:

- La gestión de proyectos consiste en cómo los proyectos contribuyen a alcanzar el objetivo de la organización (Nenni et al, 2014)
- La documentación de proyectos, la división de roles y la planificación de proyectos influyen en la colaboración (Bergema, 2011)

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ESCRIBETU RESPUESTA

1

¿Cuál es tu opinión acerca de esta oportunidad?

2

¿Cómo podrías actualizarte sobre los proyectos y el futuro de la UIDT?

3

¿Otro comentario?

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3

Compartir conocimientos y aprender de los demás para obtener mejores resultados

DESCRIPCIÓN
Conocimiento compartido por parte de todos los actores para tener un mejor entendimiento y facilitar la colaboración.

“A veces como físico no tienes el conocimiento básico de la parte clínica y es bueno que los médicos te vayan explicando. [...] Tú vas a dar una solución desde la parte científica y tecnológica.”

- Estudiante de maestría

Necesidades de los actores de la UIDT:

- Tener conocimiento básico de la otra disciplina con la que van a trabajar
- Compartir y aportar con su conocimiento
- Recibir apoyo de las otras disciplinas

Proyecto de maestría

Fundamentación:

- Cuando los actores colaboran como un sistema colaborativo el aprendizaje beneficia a toda la organización (Coccia & Cardario, 2014)
- La integración y el intercambio de conocimientos y recursos garantiza el crecimiento sostenible de la unidad (Stoimenova & De Lille, 2017)

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ESCRIBETU RESPUESTA

1

¿Cuál es tu opinión acerca de esta oportunidad?

2

¿Cómo podrías compartir conocimiento y aprender de los demás?

3

¿Otro comentario?

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4 Apoyo entre los actores para mantenerse comprometidos con los proyectos

DESCRIPCIÓN:
Brindarse apoyo entre los actores para alcanzar los objetivos y no perder la motivación durante el desarrollo del proyecto.

"Me emociona mucho el proyecto porque es algo para un problema muy real en México y para los pacientes. Aunque a veces están las frustraciones de que no hay tiempo, no hay presupuesto o cosas así."
- Académico Titular

ESCRIBETU RESPUESTA

1 ¿Cuál es tu opinión acerca de esta oportunidad?

2 ¿Cómo podrías brindar apoyo a los demás para que se mantenga el nivel de compromiso?

3 ¿Otro comentario?

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Necesidades de los actores de la UIDT:

- Trabajar en proyectos que sean de su interés
- Trabajar con casos reales
- Recibir apoyo de las otras disciplinas para generar impacto
- Tener los recursos (espacio, tiempo, dinero, actores) para alcanzar el objetivo del proyecto

Proyecto de maestría

Fundamentación:

- La colaboración permite el desarrollo de avances e innovaciones sociales (Bergema et al, 2010).
- La colaboración transdisciplinaria aborda los "problemas reales" explorando opciones para resolver problemas sociales (Lang et al, 2012)

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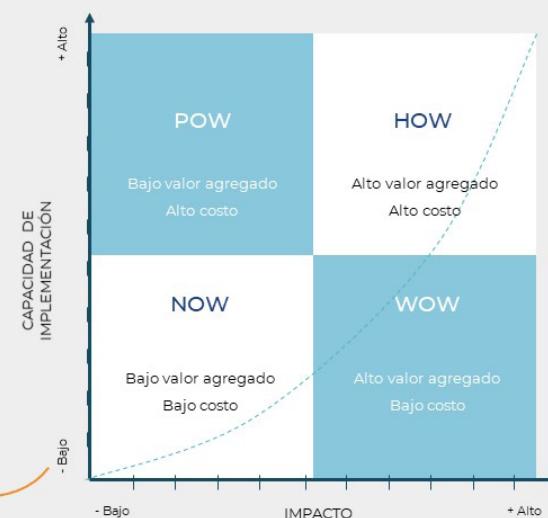
Matriz para priorizar

Matriz How-Now-Wow (Gamestorming, 2011)

PRIORIZA LAS OPORTUNIDADES:
Selecciona cada uno de los números y colócalos sobre la matriz en el cuadrante de tu preferencia

- 1 Construir una red de colaboración entre los actores de la UIDT
- 2 Estar actualizados sobre el estatus de los proyectos y el futuro de la UIDT
- 3 Compartir conocimientos y aprender de otros para obtener mejores resultados en los proyectos
- 4 Apoyo entre los actores para mantenerse comprometidos con los proyectos

Desplaza los cuadros a la matriz



Proyecto de maestría

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Siguientes pasos

- 1 Envíame la presentación con tus respuestas, a más tardar el jueves, de preferencia.
- 2 ¿Quieres unirte a una sesión de trabajo?
Elige el horario de tu preferencia en el siguiente link:
<https://forms.gle/nQ8UB7VYsmshv9JR8>
- 3 Espera la confirmación (por correo)

La llamada será por Zoom y vamos a trabajar en una plataforma que se llama Mural, es mejor usar computadora. La sesión está planeada para una hora.

¿Alguna duda?
r.moranresendiz@student.tudelft.nl

¡Muchas gracias!



Appendix J. Examples of actors' answers shared in the sensitizing booklets

2 Estar actualizados sobre el estatus de los proyectos y el futuro de la UIDT

DESCRIPCIÓN
Involucrar a los actores en el desarrollo de los proyectos y tener una visión general de la actividad en la UIDT.

"Había una reunión mensual en la cual se veían los avances, los protocolos de investigación, nuevas ideas que podrían surgir que le darían forma a nuevos proyectos"
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- Dar y recibir retroalimentación sobre los avances del proyecto
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Proyecto de maestría

Fundamentación:

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- La documentación de proyectos, la división de roles y la planificación de proyectos influyen en la colaboración (Bergema, 2011)

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ESCRIBE TU RESPUESTA

- 1 ¿Cuál es tu opinión acerca de esta oportunidad?

Como se menciona, había reuniones mensuales pero muchas veces no se llegaba a ningún punto.
- 2 ¿Cómo podrías actualizarte sobre los proyectos y el futuro de la UIDT?

Las reuniones son muy útiles pero si se llevan bajo alguna metodología de desarrollo de proyectos que evite que se salgan del punto de interés. Además así es más fácil ver el avance de los proyectos y las tareas a realizar.
- 3 ¿Otro comentario?

Esto, suponiendo que ya existe una red de colaboración en la que todos están comprometidos.

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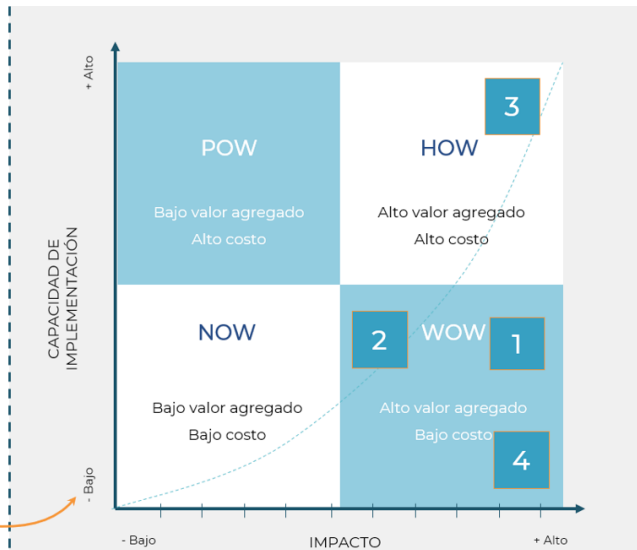
Matriz para priorizar

Matriz How-Now-Wow (Gamestorming, 2011)

PRIORIZA LAS OPORTUNIDADES:
 Selecciona cada uno de los números y colócalos sobre la matriz en el cuadrante de tu preferencia

- 1 Construir una red de colaboración entre los actores de la UIDT
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- 4 Apoyo entre los actores para mantenerse comprometidos con los proyectos

Desplaza los cuadros a la matriz



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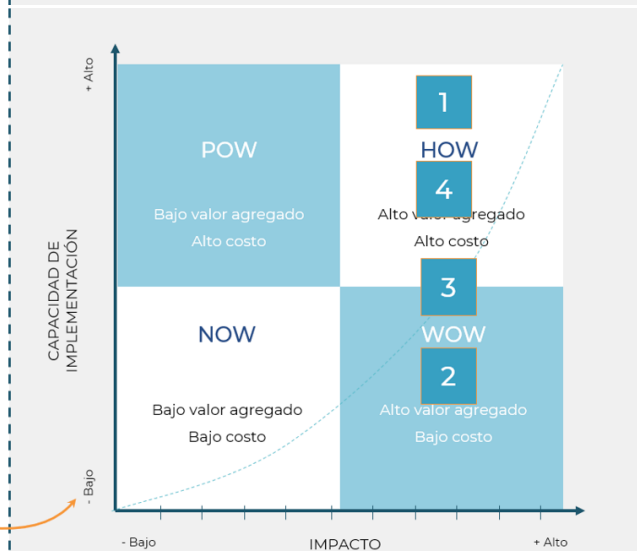
Matriz para priorizar

Matriz How-Now-Wow (Gamestorming, 2011)

PRIORIZA LAS OPORTUNIDADES:
 Selecciona cada uno de los números y colócalos sobre la matriz en el cuadrante de tu preferencia

- 1 Construir una red de colaboración entre los actores de la UIDT
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Desplaza los cuadros a la matriz



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Appendix K. Trend analysis

Demographics	Economic	Socio-cultural	Technological	Ecological	Political
Information-sharing across laboratories and orders. (Apuzzo & Kirkpatrick, 2020)	10-30% rate of unemployment (Javanmardian, Shellenbarger, Smith, 2020)	Open information and public studies over secret research (Apuzzo & Kirkpatrick, 2020)	Online repositories provide immediate access to recent studies (Apuzzo & Kirkpatrick, 2020)	Decreasing carbon footprint by reducing travelling (Price, 2020)	Collaboration between private and public hospitals in Mexico (Ramirez Coronel, 2020)
Broader and more diverse audiences in online conferences (Price, 2020)	COVID-19 represents an economic shortfall for healthcare organisations (Javanmardian, Shellenbarger, Smith, 2020)	Global collaboration among scientists (Apuzzo & Kirkpatrick, 2020)	3D Print medical equipment (Medical Futurist, 2020)	Reduction of doctor-patient visits (Medical Futurist, 2020)	Health is an investment in the future; countries need to invest in health (Adhanom Ghebreyesus, 2020)
Global projects (Ku, 2018)	Increase in unemployment can equate over one percent decrease in revenue (Javanmardian, Shellenbarger, Smith, 2020)	Collaboration between hospitals and laboratories globally (Apuzzo & Kirkpatrick, 2020)	Remote healthcare (Medical Futurist, 2020)		National funding to address gaps in health systems and health infrastructure (Adhanom Ghebreyesus, 2020)
Building a global network to speed up the process of finding the possible vaccine (Medical Futurist, 2020)		Multi stakeholders collaboration between countries, academia, companies, and governments. (Apuzzo & Kirkpatrick, 2020)	Online conferences, symposia, e-posters, and virtual networking sessions. (Kwon, 2020; Price, 2020)		Provide support to the most vulnerable countries (Adhanom Ghebreyesus, 2020)
		Experimenting with technology. (e.g. make adjustments in real-time during a video call). (Price, 2020)	Using a project management tool (Ku, 2018)		
		In the post-COVID-19 world, there could be a rise in science. (Medical Futurist, 2020)	The rise of telemedicine (The Medical Futurist, 2020)		
		Information sharing (Apuzzo & Kirkpatrick, 2020)	Digital health for mental health (Medical Futurist, 2020)		
			Chats with chatbots (Medical Futurist, 2020)		

Appendix L. Prototype of roadmap



OBJETIVO

Presentar una estrategia para la UIDT con base en las entrevistas y las sesiones colaborativas realizadas

INSTRUCCIONES*

Revisa la estrategia planteada en la diapositiva 3 y responde las preguntas en las diapositivas 4-8. Duración: 20 min.

* Busca los títulos y recuadros en color naranja.

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UIDT Roadmap estratégico	H1 Visión de las actividades 2021	H2 Estructurar la unidad 2024	H3 Visión estratégica 2027	VISION A FUTURO
<p>Soporte para el desarrollo de proyectos</p> <p>Beneficios</p> <ul style="list-style-type: none"> Visibilidad de los proyectos Estructura para el desarrollo de proyectos <p>Propuesta</p> <ol style="list-style-type: none"> LISTA DE PROYECTOS ACTIVOS ESTRUCTURA DE PROYECTOS ACTUALIZAR LINEAS DE INVESTIGACIÓN Y DESARROLLO 	<p>Los actores perciben los beneficios de formar parte de la UIDT</p> <p>SEGUIMIENTO DE PROYECTOS</p> <p>FORO PARA INICIACIÓN DE PROYECTOS</p>	<p>Proyectos alineados a la estrategia del HGMEI y del ICAT</p> <p>NUEVOS PROYECTOS DEFINIDOS POR LA UIDT</p> <p>JUNTAS ESTRATÉGICAS ENTRE ICAT Y HGMEI</p>	<p>La UIDT como líder en investigación y desarrollo en el área de biotecnología</p>	
<p>Promover la unidad</p> <p>Beneficios</p> <ul style="list-style-type: none"> Conocer las líneas de investigación y desarrollo Conocer quiénes colaboran <p>Propuesta</p> <ol style="list-style-type: none"> PÁGINA WEB ACTUALIZADA Y UNIFICADA BLOG CIENTÍFICO EN LÍNEA PRESENCIA EN REDES SOCIALES 	<p>Exposición fuera de la unidad</p> <p>Posicionarse como un referente en México</p>	<p>Lineas de Investigación basadas en necesidades locales</p> <p>Posicionarse como referente en América Latina</p> <p>JOURNAL CIENTIFICO EN LINEA</p>	<p>Una comunidad científica líder en América Latina, enfocada en problemas locales y globales.</p>	
<p>Construir una comunidad de conocimiento</p> <p>Beneficios</p> <ul style="list-style-type: none"> Conocer el trabajo de los demás Los actores están en constante aprendizaje <p>Propuesta</p> <ol style="list-style-type: none"> MINI-SEMINARIOS DIGITALES VIDEO DE CADA SEMINARIO VIDEOTECA CIENTIFICA EN LINEA 	<p>Estructura y planeación de seminarios</p> <p>Documentación de cada seminario</p>	<p>Conocimiento compartido</p> <p>Acceso para consultar lo compartido en los seminarios</p> <p>VIDEOTECA CIENTIFICA EN LINEA</p>	<p>Una comunidad científica líder en América Latina, enfocada en problemas locales y globales.</p>	

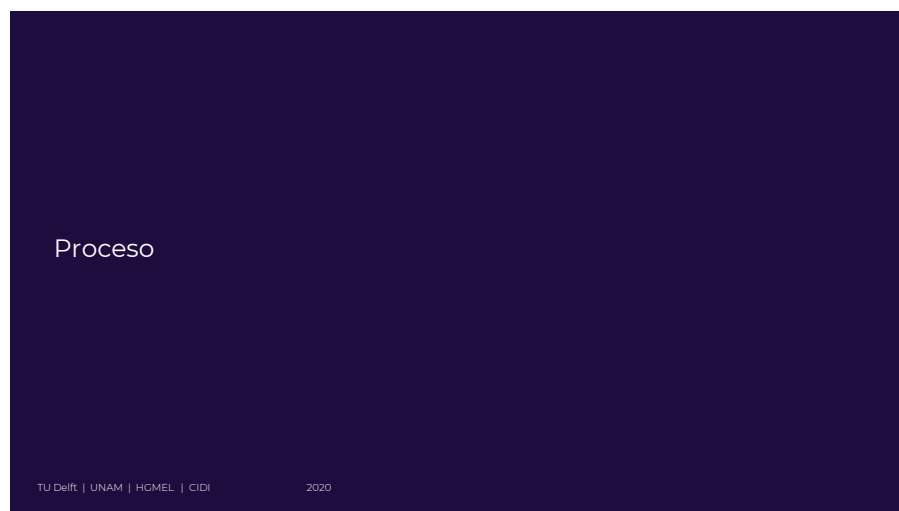
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¿Cuál es tu opinión sobre cada propuesta? Escribe tu opinión en los recuadros blancos (usa las preguntas como guía)

Roadmap estratégico	H1 Visión de las actividades 2021	H2 Estructurar la unidad 2024	H3 Visión estratégica 2027	VISION A FUTURO
<p>Soporte para el desarrollo de proyectos</p> <p>Propuesta</p> <ol style="list-style-type: none"> LISTA DE PROYECTOS ACTIVOS ESTRUCTURA DE PROYECTOS ACTUALIZAR LINEAS DE INVESTIGACIÓN Y DESARROLLO <p>¿Qué sería útil para la UIDT?</p> <p>¿Es esto viable? ¿Cómo se podría lograr?</p>	<p>SEGUIMIENTO DE PROYECTOS</p> <p>FORMATO DE INICIACIÓN DE PROYECTOS</p>	<p>NUEVOS PROYECTOS DEFINIDOS POR LA UIDT</p> <p>JUNTAS ESTRATÉGICAS ENTRE ICAT Y HGMEI</p> <p>¿Cómo consideras que estas juntas podrían contribuir a la UIDT?</p>	<p>La UIDT como líder en investigación y desarrollo en el área de biotecnología</p>	
<p>Promover la unidad</p> <p>Propuesta</p> <ol style="list-style-type: none"> PÁGINA WEB UNIFICADA Y ACTUALIZADA BLOG CIENTIFICO EN LÍNEA PRESENCIA EN REDES SOCIALES <p>¿Qué incluirías en la página? ¿Quién(es) sería responsable?</p> <p>¿Qué valor ves en un blog científico? ¿Consideras que sería útil para la UIDT?</p>	<p>JOURNAL CIENTIFICO EN LINEA</p>	<p>¿Cuál es el valor de tener un journal? ¿Qué se necesita para lograrlo?</p>	<p>Una comunidad científica líder en América Latina, enfocada en problemas locales y globales.</p>	
<p>Construir una comunidad de conocimiento</p> <p>Propuesta</p> <ol style="list-style-type: none"> MINI-SEMINARIOS DIGITALES VIDEO DE CADA SEMINARIO VIDEOTECA CIENTIFICA EN LINEA <p>¿Cómo que funcionarían? ¿Las consideras viables?</p> <p>¿Cuál sería el beneficio de grabar los seminarios? ¿Cómo crees que se podría definir la estructura? ¿Sería útil para ti?</p> <p>¿Consideras viable tener una videoteca? ¿Sería útil para ti?</p>	<p>ESTRUCTURA DE SEMINARIOS ESTANDARIZADA</p>	<p>¿Consideras viable tener una videoteca? ¿Sería útil para ti?</p>	<p>Una comunidad científica líder en América Latina, enfocada en problemas locales y globales.</p>	

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Appendix M. Slides for final meeting



Agenda

Introducción	5 min
Síntesis de mi proyecto	5 min
Propuesta de estrategia para la UIDT	10 min
Sesión de trabajo: ajustes a la estrategia	25 min
Conclusión y siguientes pasos	5 min

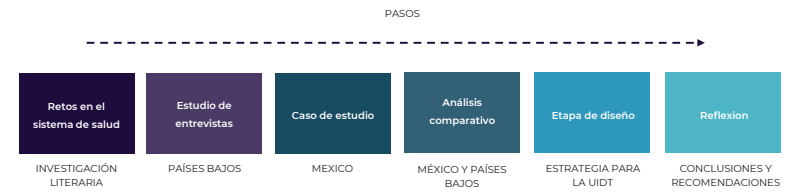


PREGUNTA DE INVESTIGACIÓN

¿Cómo formar colaboraciones transdisciplinarias efectivas en el sector salud?

Transdisciplina

Colaboración entre múltiples disciplinas en la que no se identifican esfuerzos individuales, sino un esfuerzo de equipo. La transdisciplina es como un pastel, en donde el resultado es diferente a los ingredientes iniciales (Choi & Pak, 2006).



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UIDT		H1	H2	H3
Roadmap estratégico		Estructurar la unidad 2021	Visión estratégica 2025	Referente internacional 2030
Soporte organizacional y para el desarrollo de proyectos	Propuesta	1 ESTRUCTURA DE PROYECTOS 2 LISTA DE PROYECTOS ACTUALIZADA 3 MANUAL DE INTRODUCCIÓN A LA UIDT	REPORTE MENSUAL DE AVANCE DE PROYECTOS PLATAFORMA PARA VINCULACIÓN Y FINANCIAMIENTO REUNIONES ESTRATÉGICAS ENTRE ICAT Y HOMEL	NUEVAS LINEAS DE INVESTIGACIÓN DEFINIDAS POR LA UIDT ACTUALIZACIÓN DE OBJETIVOS DE LA UNIDAD
Construir una comunidad de conocimiento	Propuesta	1 SEMINARIOS EN LÍNEA 2 SALARIOS COLABORATIVO	DOCUMENTACIÓN DE SEMINARIOS 3 SESIONES DE INVESTIGACIÓN EN CARGO	VIDEOTECA CIENTÍFICA EN LÍNEA
Promover y consolidar la unidad	Beneficios	1 PÁGINA WEB ACTUALIZADA Y UNIFICADA 2 PRESENCIA EN REDES SOCIALES	3 ABRIR ÁREA DE BIOTECNOLOGÍA EN JARIT (JOURNAL OF APPLIED RESEARCH & TECHNOLOGY) 4 PUBLICAR EN LA REVISTA MEDICA DEL HOSPITAL GENERAL	5 CONFERENCIA CIENTÍFICA

VISION A FUTURO

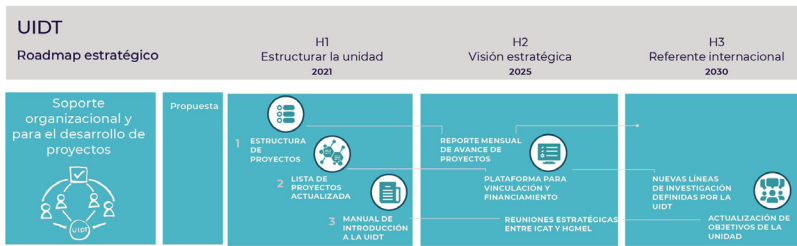
La UIDT es líder en investigación y desarrollo en el área de biotecnología

Una comunidad científica consolidada y referente en América Latina, enfocada en problemas locales y globales.

UIDT		H1	H2	H3
Roadmap estratégico		Estructurar la unidad 2021	Visión estratégica 2025	Referente internacional 2030
Soporte organizacional y para el desarrollo de proyectos	Propuesta	1 ESTRUCTURA DE PROYECTOS 2 LISTA DE PROYECTOS ACTUALIZADA 3 MANUAL DE INTRODUCCIÓN A LA UIDT	REPORTE MENSUAL DE AVANCE DE PROYECTOS PLATAFORMA PARA VINCULACIÓN Y FINANCIAMIENTO REUNIONES ESTRATÉGICAS ENTRE ICAT Y HOMEL	NUEVAS LINEAS DE INVESTIGACIÓN DEFINIDAS POR LA UIDT ACTUALIZACIÓN DE OBJETIVOS DE LA UNIDAD

UIDT		H1	H2	H3
Roadmap estratégico		Estructurar la unidad 2021	Visión estratégica 2025	Referente internacional 2030
Soporte organizacional y para el desarrollo de proyectos	Propuesta	1 ESTRUCTURA DE PROYECTOS 2 LISTA DE PROYECTOS ACTUALIZADA 3 MANUAL DE INTRODUCCIÓN A LA UIDT	REPORTE MENSUAL DE AVANCE DE PROYECTOS PLATAFORMA PARA VINCULACIÓN Y FINANCIAMIENTO REUNIONES ESTRATÉGICAS ENTRE ICAT Y HOMEL	NUEVAS LINEAS DE INVESTIGACIÓN DEFINIDAS POR LA UIDT ACTUALIZACIÓN DE OBJETIVOS DE LA UNIDAD

COLLABORATION IN HEALTHCARE



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2020



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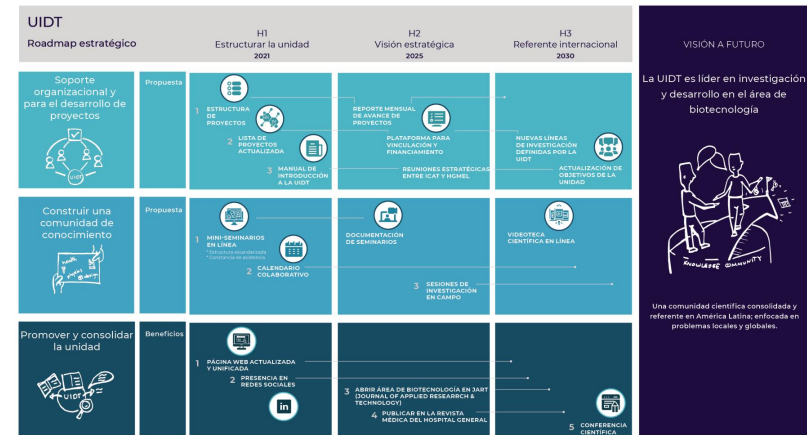
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SESIÓN DE TRABAJO

Ajustes y sugerencias a la estrategia

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CONCLUSIÓN

Siguientes pasos

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Siguientes pasos
ENTREGABLES

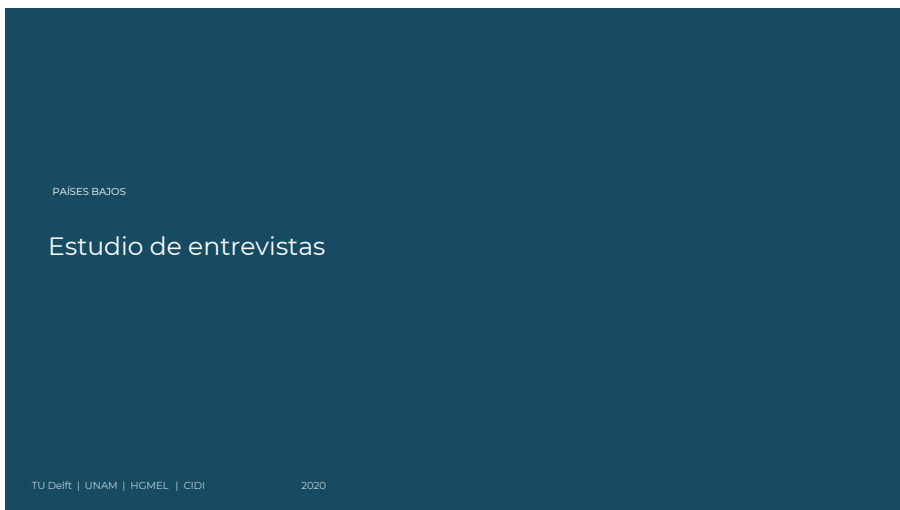
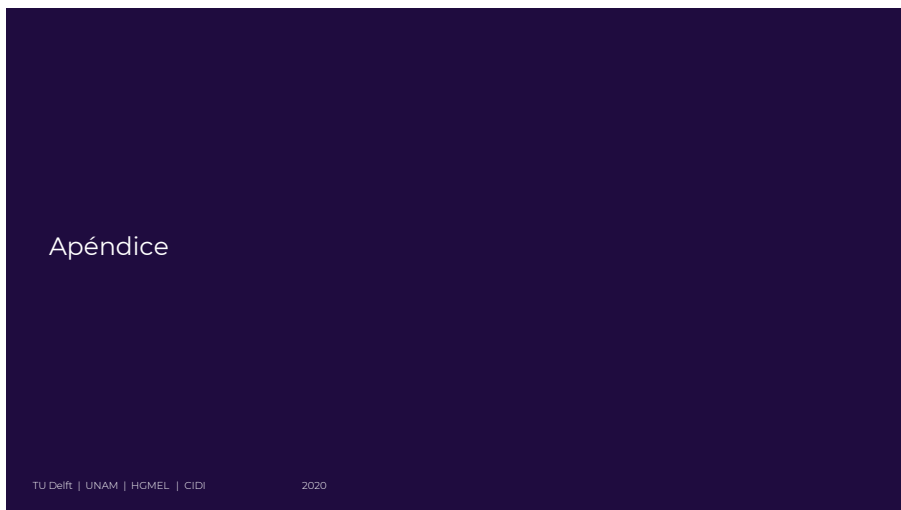
1. Reporte de tesis en inglés
2. Reporte en español para la UIDT con la estrategia a future

Presentación: Viernes 10 de Julio a las 8:45 am via Zoom

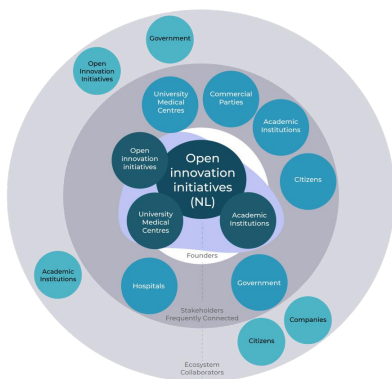
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¡Gracias!

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SÍNTESIS DE AGENTES PRESENTES EN INICIATIVAS EN LOS PAÍSES BAJOS



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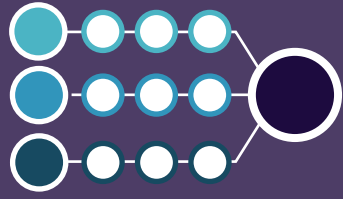
Barriers - NL	Enablers - NL
1 Lacking space and tools	1 Having communication channels
2 Getting through health regulations	2 Providing facilities and tools
3 Trying to understand the hierarchy levels	3 Having clarity during legal agreements
4 Lacking a collaborative structure	4 Having clear roles and tasks
5 Unclear organizational purpose	5 Sharing a vision
6 Keeping it interesting for all	6 Assisting and creating events
7 Not having a clear project goal	7 Sharing updates
8 Not having available time	8 Building a collaborative network
9 Rotating actors	9 Collaboration with external parties
10 Letting go of discipline behaviours or attitudes	10 Being open for experimentation
11 Talking but not collaborating	11 Breaking down the steps
12 Having a different view of the world	12 Having an iterative process
	13 Defining success metrics
	14 Selecting the right members
	15 Getting funding
	16 Having a collaborative process
	17 Delivering outcomes
	18 Having periodical meetings
	19 Participating actively
	20 Having a common goal
	21 Including multiple perspectives

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FACTORES PARA REALIZAR COLABORACIONES TRANSDISCIPLINARIAS

Organisational levels	Factors for transdisciplinary collaboration in healthcare
Ecosystem	a. External regulations
Organisation	a. Clear organisational purpose b. Collaboration with external parties c. Build a community
Project	a. Right members b. Project funding c. Collaborative process d. Periodical meetings e. Deliver outcomes
Actor	a. Personal commitment b. Meeting actors' needs

Thank you!



APPENDIX

Master thesis
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