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Towards a better embedding of the outcomes of cross-sector collaborations**

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Entrepreneurial universities meet their private partners: towards a better embedding of the outcomes of cross-sector collaborations.

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Abstract

In the past decades, universities' involvement in socio-economic development, which goes along with their teaching and researching activities, has defined a new role for them in society's ecosystem. This new role is often referred with the term of "entrepreneurial" university, whose objectives are positive societal, economic and environmental impacts. In order to fulfil such objectives, entrepreneurial universities might engage in cross-sector collaborations with external organisations. Despite the great contributions that cross-sector collaboration can give to the partners involved, the outcome is mostly unfocussed and rarely embedded. This paper explores the outcome embedding in the cross-sector collaboration between entrepreneurial universities and the private sector. To this end, we provide the case of the collaboration between a Dutch airline company and four Dutch entrepreneurial research and teaching institutions. We aim to uncover *hindering* and *enabling* factors to the outcome embedding in order to design an interaction platform, *design it together*. This platform will be a tool to encourage the outcome embedding, moving from *being inspired by* to the actual *implementation of* the cross-sector collaboration. In order to fulfil this goal, this study employs a research through design methodology. This approach is a generative process, where cyclic loops of iterations and evaluations with stakeholders tend to the research goal. The solution is a digital platform, co-created with all stakeholders. This study can inspire practitioners and future research on the problem of unsuccessful cross-sector collaborations, between entrepreneurial universities and external organisations, with more emphasis on the value of embedding and translating the outcomes.

Keywords: Innovation; Outcome embedding; Research through design; Boundary experiences; Cross-sector collaboration.

In a knowledge-based society with increasing societal and economical needs, universities can assume a different role (Safiullin, Fatkhiev & Grigorian, 2014). Etzkowitz & Leydesdorff (2000) call this new type of university "entrepreneurial", where the involvement of socio-economic development is as important as their teaching and researching activities. These new type of university does not only represent a knowledge tank for external organisations, but it also takes an active role as an actor of change. The entrepreneurial university wants to be part of the change, developing solutions based on in depth scientific studies (Safiullin & al., 2014). Hence, these types of research and teaching institutions seek for external collaborations to acquire new skills and prototype

new solutions that might have positive social, economic and environmental impacts. In a more complex society, where a sole stakeholder can hardly solve contemporary challenges, the cross-interaction with different domains and expertise is often suggested, if not extremely needed (Rondinelli & London, 2003).

According to Chesbrough, Vanhaverbeke, & West (2006), cross-sector collaboration cherish the formation of novelties, bringing innovative contributions to all parties involved. However, a cross- sector collaboration often lacks common objectives, trust and appropriate strategies, leading to unsuccessful alliances (Bryson, Crosby, & Middleton Stone, 2006; Jamali & Keshishian, 2008), where the outcome is mostly unfocused and rarely embedded (Pavitt, 2001; Laursen & Salter, 2004). This paper explores the collaboration between four Dutch entrepreneurial universities and teaching institutions, mainly focused on design and aviation, with a Dutch airline company. In this context, the challenges of cross-sector collaboration are amplified by the fact that design professionals have a more intuition-based approach towards problem solving, whereas business professional tend to have a much more rational approach (Calabretta & al., 2016). This might cause frictions and tensions between the twos, which could lead to difficulties in the implementation and embedding of the collaboration outcomes. The goal of this research is to uncover factors that hinder as well as enable this cross-sector collaboration, with an emphasis on the outcome embedding. Once these factors are detected, we aim to design a cross-sector boundary experience (Feldman, Khademian, Ingram, & Schneider (2006), namely the interaction platform, which could shift the collaboration's focus from mainly adding on each other' knowledge and expertise to the prototype and embedding of the common outcome.

According to Feldman & al. (2006), cross-sector boundary experiences are shared or joint activities that create a sense of community, enhancing the ability to overcome stakeholders' boundaries. In order to succeed, cross-sector boundary experiences need to take place within a cross-sector boundary group, with the aid of cross-sector boundary objects (Carlile, 2004). The cross-sector boundary group examined is the one created by the collaboration of the entrepreneurial universities and the airline company. Design professionals often use visualisations and rapid prototypes as cross-sector boundary objects, to transcend boundaries among stakeholders (Calabretta & al., 2016). Hence, our contributions to the entrepreneurial university and industry collaboration literature is to make use of the cross-sector boundary experiences, groups and objects, with an emphasis on the last ones. We believe that, by employing visualisations and prototypes in the creation of the interaction platform, the outcome embedding will be more luckily to happen (Calabretta & al., 2016).

Literature Review

In the following section, we introduce the three main research domains on which this study is grounded. First, we discuss the cross-sector collaborative innovation, highlighting the actions, behaviours and leadership undertaken. Second, we investigate the literature referring to the new role of the entrepreneurial university. Finally, we discuss the literature referring to the tensions created and the outcome embedding when multiple stakeholders co-design.

Cross sector Collaborative Innovation

Despite the great contribution that cross-sector collaborations have in cherishing novelties (Chesbrough & al., 2006), they often lack common objectives, trust and appropriate strategies, leading to unsuccessful alliances (Bryson & al., 2006; Jamali & Keshishian, 2008). An unsuccessful cross-sector collaboration is characterised by unfocused and rarely embedded outcomes (Pavitt, 2001; Laursen & Salter, 2004). Failure or success depend on many factors, such as behaviours, actions, trust and available resources (Jamali & Keshishian, 2008). In addition, the type of leadership undertaken by the partners also affect the cross-sector collaboration's success (Bryson & al., 2006; Crosby & Bryson, 2010). A successful cross-sector collaboration does not only work on an institutional level but it also enhance collaborative behaving between individuals. According to Buerkel (2013) and Kanter (1994), personal commitment and individual curiosity are important drivers for successful cross-sector collaboration as much as active and proactive roles taken on an institutional level (Dahlander & Piezunka, 2013).

If collaborative behaviours, personal commitment and individual curiosity must be encouraged, determinate actions must be taken on an institutional level to maximise the external contributions (Dahlander & Piezunka, 2013). The authors make a distinction between *proactive* and *reactive* attentions. The former refers to the idea of submitting internally developed ideas to the external partners. The latter to the one of responding actively to the external stimuli in order to show interest. However, employing people with a strong curiosity or a strong result-driven personality (Kanter, 1994) and engaging in proactive and reactive attention is not enough. A shared agreement and multiple decision makers often characterise a cross-sector collaboration (Bryson & al., 2006; Crosby & Bryson, 2010). Hence, the type of leadership role undertaken by the partners could have a strategic relevance for the success of cross-sector collaborations. Bryson & al. (2006) and Crosby & Bryson (2010) believe that the cross-sector collaboration leadership should be built in a regime of legitimacy and sharing, where a shared purpose is created through formal and informal decision making processes (Samii & al., 2002). This type of leadership is named "integrative", which means gathering different groups, each with a different level of expertise and domains, in semi-permanent ways (Crosby & al., 2010). This leadership manage a collection of actors drawn together because of their complementary resources and capabilities defined as a cross-sector boundary group (Feldman & al., 2006). This collection of actors run to co-create and co-produce cross-boundary experiences, building on each other's knowledge gaps. The cross-sector boundary experiences are facilitated by the use of boundary objects and tools (Carlile, 2004), designed for translating the different organizational languages and beliefs into sharable knowledge within the stakeholders.

To conclude, we have seen how cross-sector collaborations can be influenced by three main elements. Firstly, the curiosity, engagement and creativity of individuals. Secondly, the activities undertaken on an institutional level, both proactive and reactive ones. Thirdly, the type of leadership, an integrative one, that could manage the creation of cross-sector boundary groups, sustained with cross-sector boundary experiences and tools that would break through stakeholders' barriers. The elements highlighted in this literature review were useful to focus this research on the interplay between the individual factors, such as curiosity and engagement, and the institutional ones, namely the reactive and proactive approaches undertaken by an integrative leadership. This interaction can happen in the creation of cross-sector boundary groups, experiences and objects, determining a cross-sector collaboration towards the outcome embedding. In the next paragraph, we will discuss the characteristics and the role assumed by the entrepreneurial universities in the

collaboration with external private parties.

Entrepreneurial University

Academia and corporate environment are interacting more and more, creating an ecosystem made of multiple stakeholders where new researches, spin-off and start-ups come to life (Leydesdorff & Etzkowitz, 2001). This type of interaction is a strong synergetic collaboration, at the antipodes with the past decades where the actors only contributed according to their competences, delivering a product and not co-producing the outcome (Leydesdorff & Etzkowitz, 2001). In the new interaction between university and industry, the inter-space determinates new hybrid organizations, where the different stakeholders collaborate and work together.

Safiullin, Fatkhiev & Grigorian (2014) has explored both advantages and disadvantages of the “entrepreneurial university”. Some of the most interesting disadvantage is that university-industry interaction is rather a way to show each other interest than a way to produce a tangible product.

Furthermore, each institutions might lose their ability to innovate independently. On the other side, advantages for universities lay in a larger access to market, by increasing its possibility to produce scalable products together with the industry.

To conclude, the entrepreneurial university forms students that are capable of becoming entrepreneurs and firm founders, where the involvement in socio-economic development is critical and the inclination towards cross-sector collaboration is strongly accentuated. Rather than only serving the industry as a source of inspiration and technological generation transfer, entrepreneurial universities can build cross-sector boundary groups together with corporates and industries, where new firms, start-ups and innovative and disruptive innovation happen (Leydesdorff & Etzkowitz, 2001). However, as it was already mentioned, the interaction between entrepreneurial design-driven university and industry can generate frictions that are due to the more intuition-based and research approach of the former and the more analytical and business oriented approach of the latter (Calabretta et al., 2016). In the following paragraph, we investigate these tensions to understand how to overcome them towards the outcome embedding.

Outcome Embedding between Design & Business Professionals

Designers often find it difficult to break through the company’s barriers to implement and embed design outcomes, leaving the client with great innovative and inspirational concepts yet not likely to be implemented (Calabretta, Gemser & Karper, 2016). According to Calabretta et al. (2016), innovation lays in the interplay between intuition and rationality, the so-called paradoxical tension. The paradoxical tension is not investigated deeply in this research, but it is worth referring to the author's’ work, where a special place is occupied by co-creation techniques and design tools (such as visualization, prototyping etc.). Those are useful to translate the design language into outcomes that are easily accessible and understandable by all stakeholders involved, making the outcomes shareable across stakeholders’ cultural boundaries (Buerkler, 2013; Calabretta & al., 2016). The role assumed by co-creation techniques and design tools can be compared to the one of cross-sector boundary groups, experiences and tools (Carlile, 2004, Feldman & al., 2006; Bryson & al., 2006).

In addition, prototypes and visualization elicit emotional commitment, rising up the

feeling of ownership, which is fundamental to embed the design outcome (Calabretta & al., 2016) also in cross-sector collaborations.

Murphy, Perrot & Rivera-Santos (2011) investigated the role that co-designing has on cross-sector collaboration outcomes. The authors claim that piloting the potential co-designed solution on a small scale can improve the chances of implementation and embedding, overcoming the gap between different knowledge and cognitive structures. In addition, the same authors affirm that designing processes and routines for cross-sector collaboration purposes can steer the focus of the company's' attention to the benefits of collaborating, facilitating the process towards embedding and implementation.

In the literature review, we first focussed on the role assumed by cross-sector boundary groups, as means to merge creative and enthusiastic individuals with reactive, proactive and integrative institutions. Then we illustrated how frictions and tensions exist between the entrepreneurial universities and their partners, focussing on the advantages and disadvantages as well as on the two different approaches towards problem solving. Finally, we presented how the same tensions arise between design professionals and business professionals, showing how the twos embrace their diversity to overcome barriers and create innovative solutions thanks to co-designing, co-piloting, visualisations, and rapid-prototyping. This analysis gives a different perspective on the variables that influence the outcome embedding, both as a success and as a failure, in the cross-sector collaboration between entrepreneurial universities and the private sector.

Methodology

In line with the exploratory objectives of this study - which include building a tangible solution and knowledge simultaneously -, this research employs a research through design methodology (Zimmerman & Forlizzi, 2008; Sanders & Stappers, 2012). This approach is a generative process, where cyclic loops of iterations and evaluations with stakeholders tend to the design and research objective (Stappers, 2007). The methodology employed was divided into two phases, each with specific aims and tools. The first phase aimed to produce knowledge around the factors that *enable* and *hinder* the cross-sector collaboration outcome embedding. To this end, 21 interviews were carried out, of about 30 to 40 minutes, with an informal conversational approach and audio recording (Patton, 2002). The panel of participants is chosen from the Dutch airline company departments and the four Dutch research and teaching institution. The selection criterion for the airline company participants was to have collaborated on research/design projects with at least one of the four institutions examined, 11 respondents were selected in total. The same criterion was adopted for the respondents from the research and teaching institutions, where 10 respondents were selected in total. The interviews were designed in three main sections. The first one aimed to uncover the positive and negative aspects of a cross-sector collaboration, in order to understand the stakeholders' motivations. In the second part, we focussed on the selection procedure of the right candidate, expertise and knowledge shared in the collaboration. The last part aimed to uncover the type of outcome of the cross-sector collaboration, both actual and desired. The structure of the interview followed a hypothetical collaboration structure: initiating (reasons), conducting (selection of people, knowledge and resources sharing) and finishing (desired and actual outcome). The second phase of the research aimed to set *design features* to be part of the interaction platform. To this end, a co-creation session took place at the Digital Studio of the airline

company. The co-creation session was recorded and video recorded, and design stimuli were used to generate creative inputs (Stappers, 2007; Sanders & al., 2012). The co-creation involved the airline company's employees and researchers from the Dutch research and teaching institutions selected. The selection criterion for the participants was the same adopted for the interviews carried out initially. Nine participants, divided into 2 groups, joined the session that lasted for about 2.5 hours. The two groups were formed in order to have an equal representation of the airline company's employees and the researchers from the institutions selected. The co-creation aimed to set *design features* by uncovering the drivers and key performance indicators (KPIs) useful to align stakeholders' aims with customer/user satisfaction (Calabretta & al., 2016). Each group carried out two exercises separately, followed by an open discussion and presentation of each group's work. The tool employed for the first part of the co-creation was a motivation matrix (see figure 2a, 2b). This tool investigates current and future expectations for the design that is under examination (Jégou, Manzini, Meroni, 2005; Morelli, 2007).

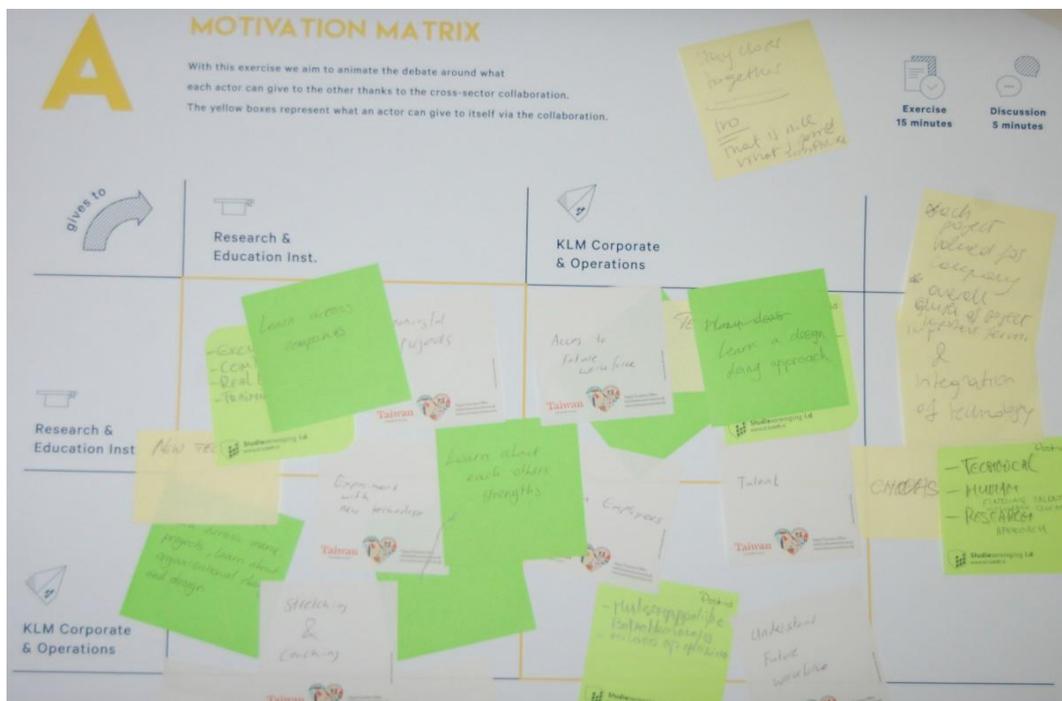


Figure 1a Motivation Matrix, group A

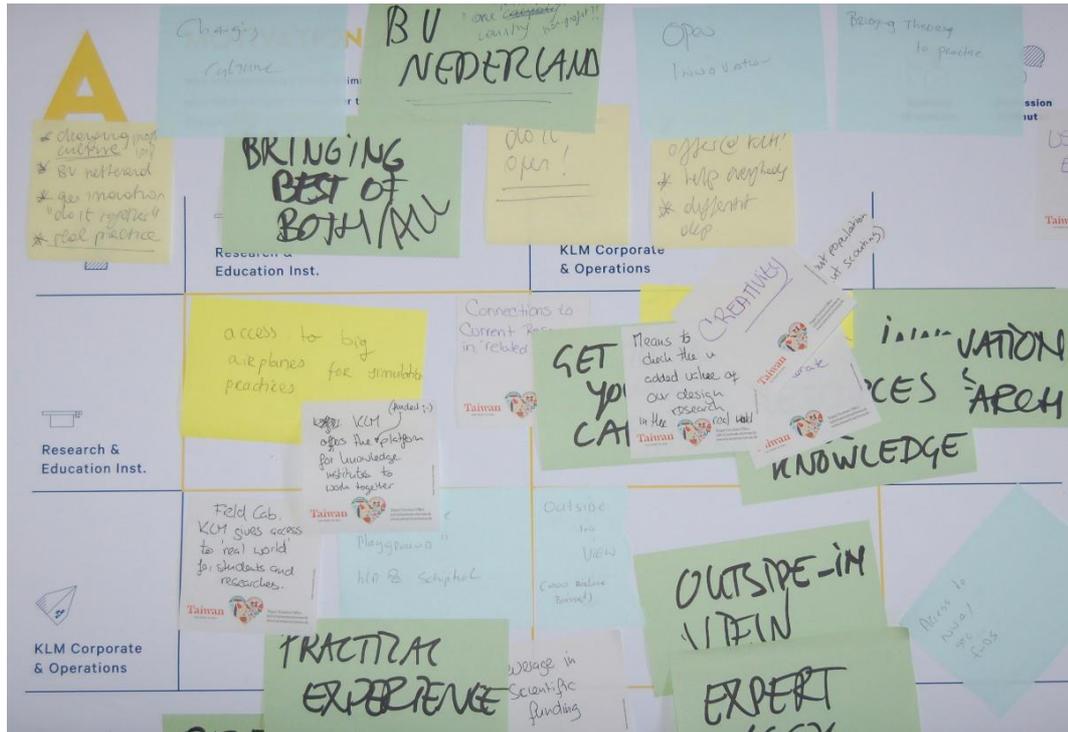


Figure 2b Motivation Matrix, group B

The second tool employed was the service flow & KPIs (see figure 3a), a design tool based on the service blueprint, which is a tool employed to manage and maintain a service (Bitner, Ostrom, & Morgan, 2007; Morelli, 2007). The *design features* were drawn by connecting the drivers (motivations), as result of the motivation matrix exercise, to the KPIs, uncovered with the service flow & KPIs exercise.

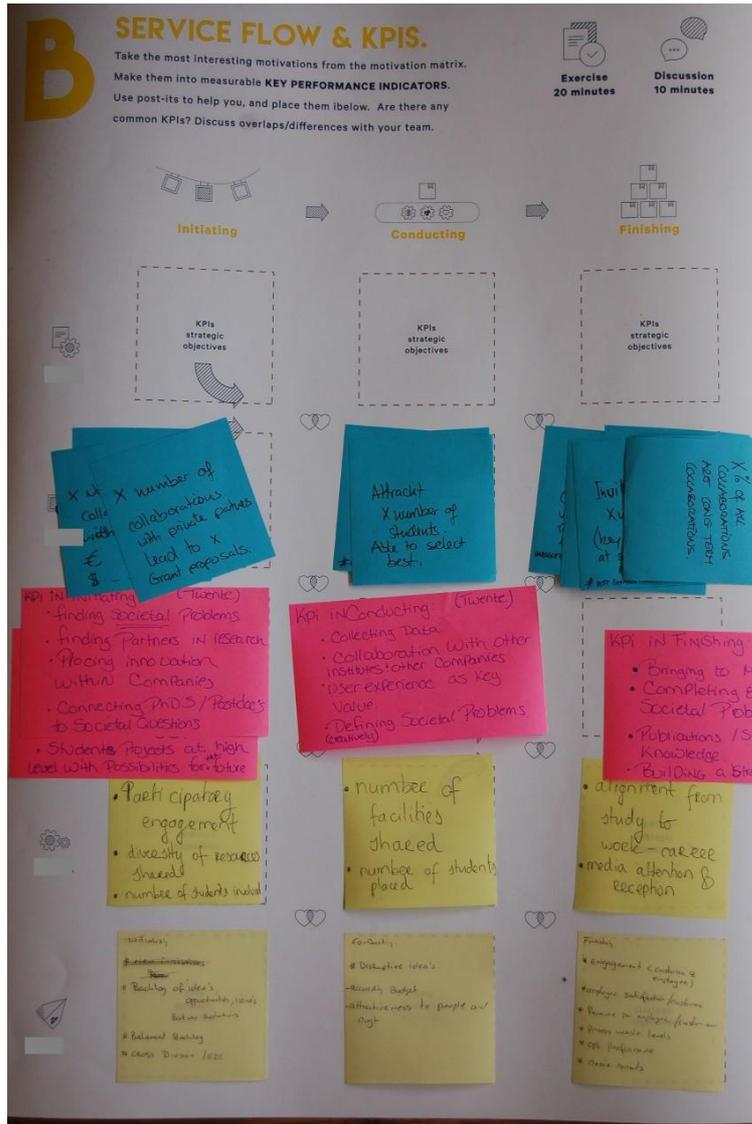


Figure 3a. Service Flow & KPIS, group A

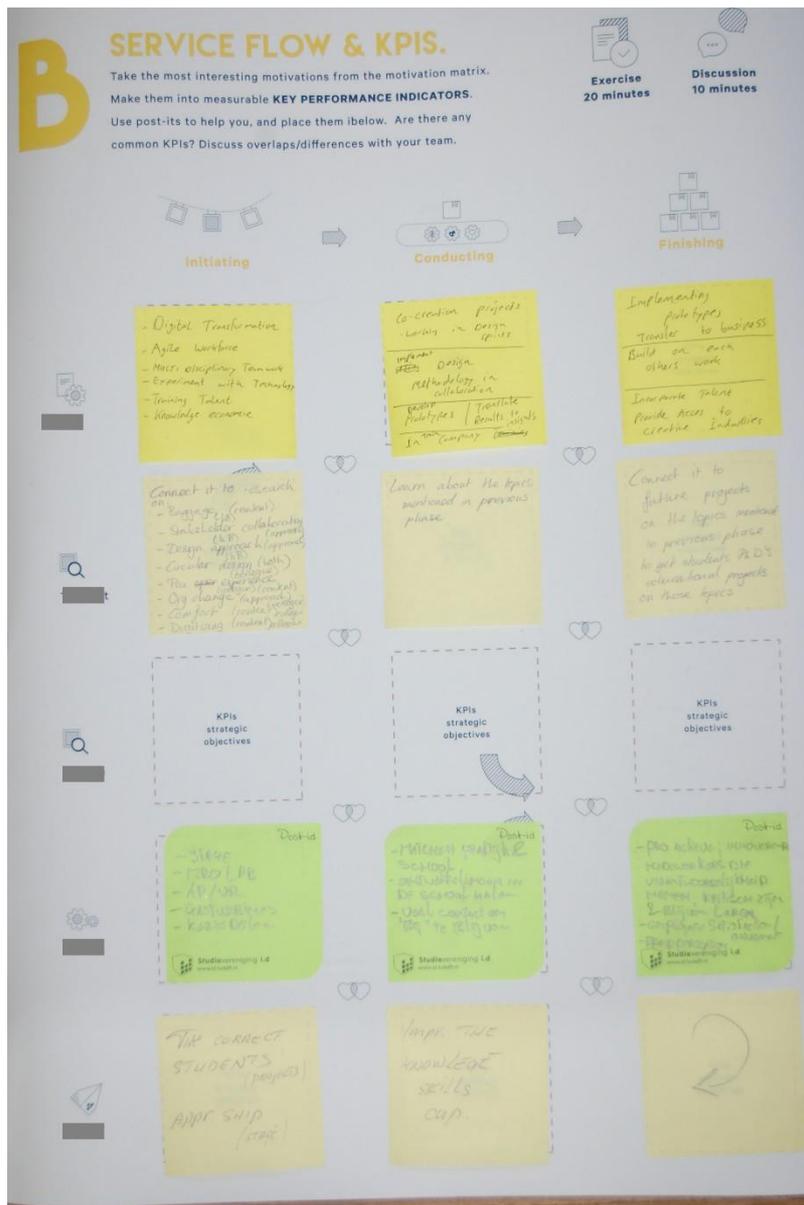


Figure 4b. Service Flow & KPIS, group B

The data gathered from the interviews and workshops were coded and clustered following multiple steps (Eisenhardt, 1989; Miles & Huberman, 1994). The materials gathered during the co-creation session included audio and video recordings, tools used and pictures taken during the session. The analysis consisted of listening and writing down the main elements (Patton, 2002). The “analysis on the wall” was employed to analyse the materials gathered, which provided both inspirations and information (Stappers & al., 2007). The data were clustered into three design features categories: People, Activities and Structures.

Findings

In this section, the results from the interviews and the co-creation session are presented. First, the factors that *enable* and *hinder* the cross-sector collaboration, drawn from the interview analysis, are briefly explained. Second, the *design features* of the interaction

platform are presented, as result of the data gathered during the co-creation session. Finally, the concept design of the interaction platform is illustrated.

Enabling & Hindering Factors for the Outcome Embedding

The enabling factors are the ones identified as responsible for the outcome embedding in the cross- sector collaboration between the Dutch Airline company and the four Dutch teaching and researching institutions. These factors are clustered in three categories, *connecting research & researchers; prototype & results as inspirational tools; behaviours learnings* (figure 3). On the other hand, the hindering factor are the ones that represent a large barrier to the outcome embedding in the cross-sector collaboration. These are clustered in three categories, *lack of structure, low commitment & enthusiasm, closed innovation* (figure 3).

Enabling Factors	Hindering Factors
Connecting Research & Researchers	Lack of Structure
Prototype & Results as Inspirational Tools	Low Commitment & Enthusiasm
Behaviours Learning	Closed Innovation

Figure 3. Enabling & Hindering Factors

Enabling Factors

Connecting Research & Researchers: This makes sure that the current researchers are tuned to the past and future ones, using the knowledge already produce to design innovative products and vice versa. (*“We already collaborated with ***, but I wish we could have a place where all the different universities and *** can come together with companies, also from different sectors, and co-design. Respondent I*)

Prototype & Results as Inspirational Tools: The strength of students lay on their ability of inspiring the stakeholders, triggering new challenges and arising new questions in the corporate culture. Prototypes are important to make the outcome tangible and sharable, therefore more luckily to be understood and embedded. (*“Companies recognize the huge potential for use design to enhance products / breakthrough innovation etc. as a student you can show that your design is impactful visually and physically by making things”*)

Respondent M)

Behaviours Learning: Personal interactions are fundamental for the success of cross-sector collaborations; trust, empathy, emotions, are often enhanced by a day-to-day working practice. Students can learn from employees and vice versa. (*“Working with students, it stimulates your own staff to think differently, to use different methods and to bring new insights. Students do not externalise the problem, they interiorise it” Respondent J*)

Hindering Factors

Lack of Structure The current situation makes the communication between stakeholders arduous and slow. The decision-making process is often depending on the chance (*“There must be a click with the professor, it is a matter of coincidence or chance, there is no clear structure and therefore there is no cross communication intra and inter faculties. Respondent H*)

Low Commitment & Enthusiasm: A low level of commitment and enthusiasm is recorded during the collaboration. This is due to time-consuming activities, loss of communication and misunderstanding of the design/research directions. (*“Sometimes they have the feeling that is a “small student project” that they do not really care. It depends if the projects are likely to be valuable for them or not” Respondent T*)

Closed Innovation: Innovations are often close innovations, hindering the knowledge flow between the stakeholders. This causes barriers between the different entrepreneurial universities working with the same partner, damaging all. (*“I say open up the findings and the researches. They are too much focused on the short end value. They ask us to become partners not like signers (I do not want to ask my students to develop only a dashboard, we want to be open to innovation, and this is an university, you know”. Respondent G*)

Design Features for the Interaction Platform.

The result of the co-creation analysis brought us to define the *design features* for the interaction platform. These are clustered in three main categories: People, Activities and Structures. The *design features* are drawn by connecting the drivers, identified with the motivation matrix, to the key performance indicators, uncovered with the service flow & KPIs tool. In fact, by connecting the goals and aims (KPIs) to the motivations and triggers (drivers) it is possible to design *design features* which are more luckily to enable the outcome embedding. Below, we briefly illustrate each category and indicate the main components.

People

People category refers to different tools that enable the connection and the communication throughout all the stakeholders involved, encouraging the outcome embedding. There are three main components: *Student Profile*, *Network Alumni*, *Open KPIs and Research Clusters*. The first one, the *Student Profile* (drivers: *collaboration cross borders, new perspectives, not airline biased* – KPIs: *selecting the right students into the right projects*) aims to connect the researches to the people that are actually carrying them on. The *Network Alumni*, (drivers: *Learn across domains and access & connect to other researches* – KPIs: *Training talented students, high level of projects, high number of students*) creates and ecosystem of entrepreneurial students working together. The last two components,

open KPIs and Research Clusters, are a way to first create an open-end environment, second to generate new knowledge based on the ones already produced (drivers: *Learn across domains and access and connect to other researches / departments; finding the uniqueness and the singularity of each* - KPIs: *Collect data, connect with other researches and businesses, build on each' others work, shared facilities*).

Activities

The activities category refers to the set of tools that could enable the actors to move from only *being connected and aligned* to the actual *making and doing* of the cross-sector collaboration. It has three main components: Finding a sponsor, Design a Sprint, Special Lectures & Events. The first one, *Finding a Sponsor* (drivers: *Get research funded* – KPIs: *Finding partners and support for researches*) aims to give a tool for researchers to find sponsors, as well as to private partners to find project to sustain. The second one, *Design a Sprint* engages stakeholders to be active player of the collaboration, by organising workshops, rapid prototyping and co-creations (driver: *Experiment and simulations via the (airline company) facilities* – KPIs: *Placing existing innovation, experiment with technologies*). Finally, *Special Lecture & Events* component is a way to share facilities and knowledge with more emphasis on the face-to-face interaction (drivers: *top-down interest and interaction with managers* - KPIs: *Incorporate talents, provide access to the creative industries, proactive involvement, media attention*).

Structures

This last category is meant to bring a set of structures and tools to organise the cross-sector collaboration. *Report ideas, Recorded Diary, and Tools Ready to Use* fall into this category. Whereas the first twos are a way to keep the stakeholders' updated and to give them the space to drop ideas, the last one is the most interesting for this study. As we already mentioned earlier, in this research we focussed on the role of co-creation techniques, rapid prototyping and visualisations in the outcome embedding of the cross-sector collaboration. Hence, this component is extremely relevant, because it elicits the shift from *thinking* to *doing* thanks to the help of tools (drivers: *train employees, gain new perspectives, learn across different domains* – KPIs: *employees and students satisfaction, engagement and learning*).

Design It Together: A Cross-sector Collaboration between Entrepreneurial Universities and a Private Partner.

The *enabling* and *hindering* factors presented earlier, together with the *design features*, set the foundation for the design of the cross-sector collaboration. The *design it together* platform is inspired by the already existing platforms that engage people all over the world, with different domains and expertise, to co-design and co-create. Ill, Brown & Davison (2010) recognise the value of the DIT, do it together platform, as they pull a large number of individuals and talents to innovate and increase performances on an ongoing basis. A do it together platform between the entrepreneurial universities and private partners will create a space for students, researchers and employees to co-design, co-create and share their results. The private partner can make use of the institutions' unique selling points, whereas the entrepreneurial universities can find funding for their research, contributing to have positive social, economic and environmental impacts.

The *design it together* platform addresses the challenges highlighted in this research by means of three main contributions. These three main clusters are also reflected in the design of the platform divided in three main sections: *Research, Doing, Who We Are*. First, the *Research* (see figure 4) section enables connection of research and researchers, thanks to the design features such as research clusters and open KPIs, giving an overview and overcoming the lack of structures reported by the respondents. Second, the *Doing* section enables the stakeholders to make use of tools like prototypes, reports and visualisations as inspirations but also as means to create innovation (see figure 6). In addition, the design features *Tools* and *Design a Sprint*, by engaging multiple stakeholders and sharing contents, open up the innovation transcending institutional barriers. Third, the *Who We Are* section illustrates clearly the objectives and goals of the partners who engaged in the collaboration (see figure 5).

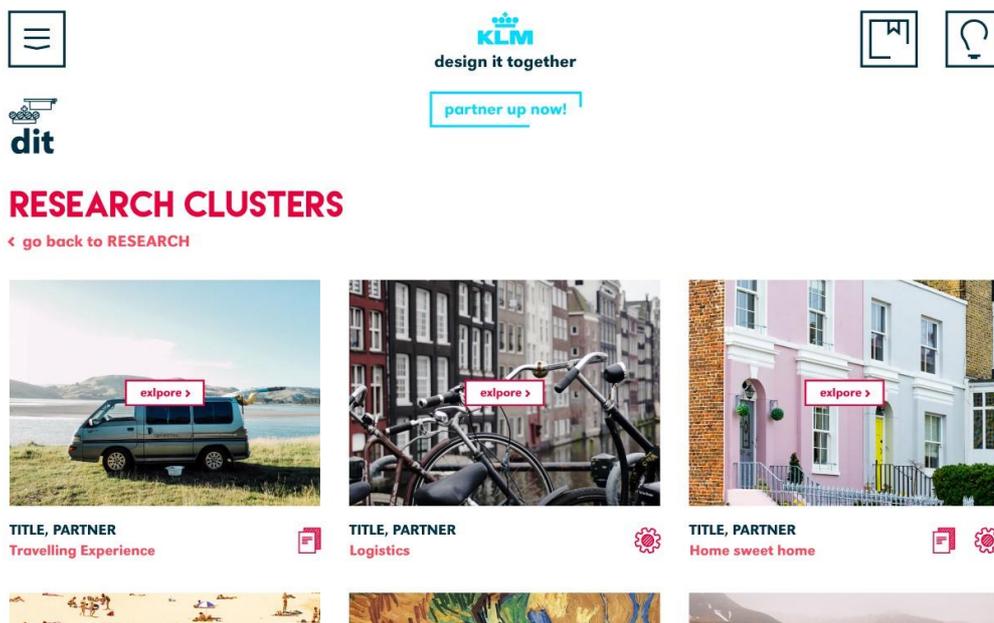


Figure 4. Research Clusters

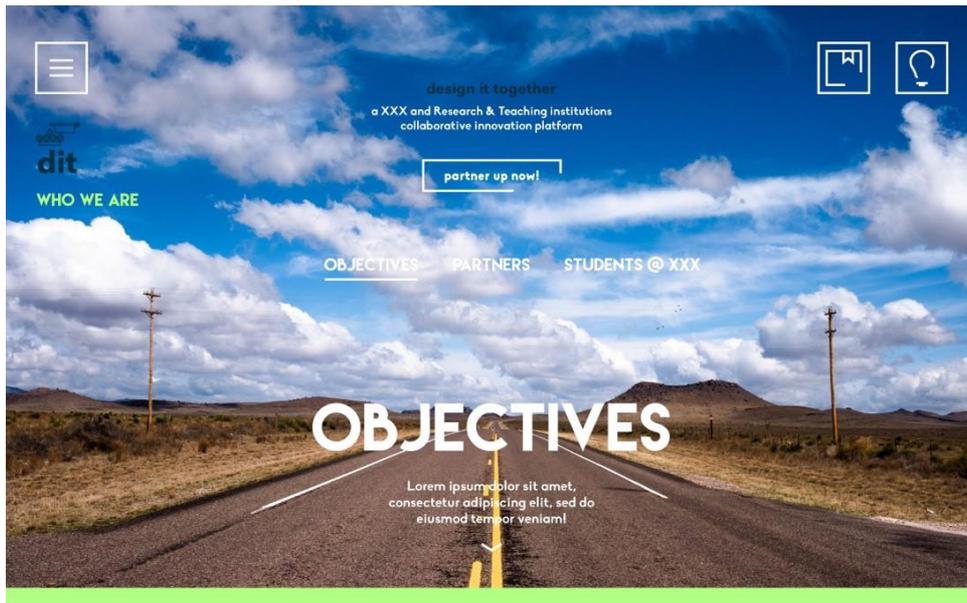


Figure 5. Who We Are, “Objectives”

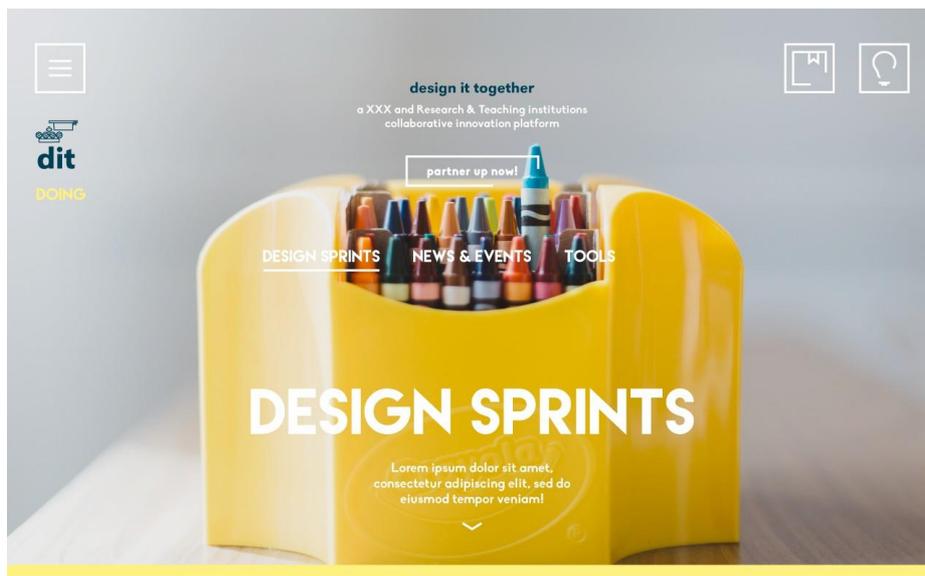


Figure 6. Doing, “Design Sprints”

This makes the collaboration trustworthy, setting the focus on the outcomes as well as being clear on the strategy taken. In addition, by showing the students profile (design feature such as videos and pictures of the project) on this section, as well as the profile of each partner, the platform encourage empathy and commitment, connecting the researches not only to abstract facts & figures but also to people that made it possible (see figure 7).

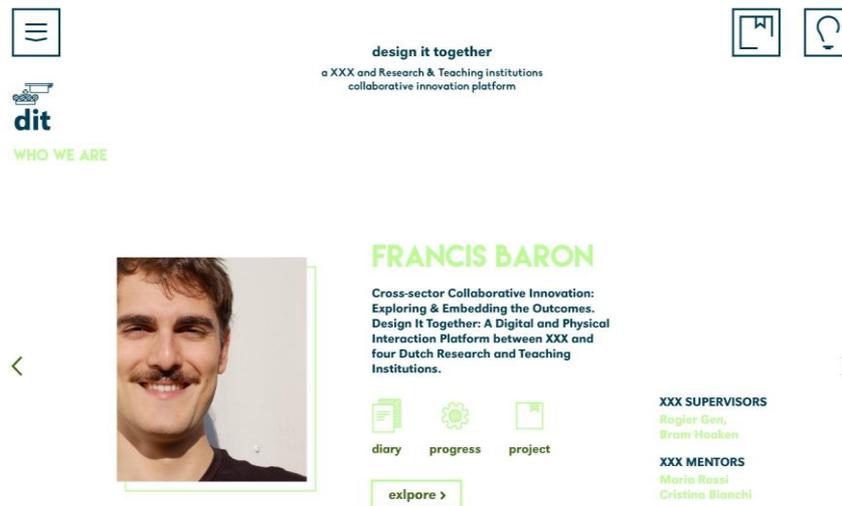


Figure 7. Student Profile

Discussion and Conclusions

In this paper, we discussed how the outcome embedding is extremely relevant in the cross-sector collaboration between entrepreneurial universities and private partners. To this end, we investigated the case of the collaboration between four Dutch entrepreneurial research and teaching institutions and a Dutch airline company. In order to uncover enabling and hindering factors to the outcome embedding, so to design an interaction platform for the stakeholders considered, 21 interviews and a co-creation session were carried out. From the analysis of these, we clustered three enabling factors and three hindering factors, together with three categories of design features to use as foundation for the design of the platform. The result is a structured cross-sector collaboration, where information, knowledge and outcomes are shareable between the stakeholders. This is presented as a friendly and open digital space, which has a strong connotation on tools, people and activities regarding the cross-sector collaboration.

The potential of this study is to be found in the accentuated interest in the outcome embedding of the cross-sector collaboration between the entrepreneurial universities and the private sector. We argued that the outcome embedding is a strong incentive for stakeholders to engage in a cross-sector collaboration, because the stakeholders, transcending their cultural boundaries, can have tangible and visible results through an embedded outcome (Calabretta et al., 2016). This is particularly true if they are co-created and a sense of commitment and enthusiasm is elicited. Furthermore, the contribution of this study is to be considered also in the application of the design methods to overcome the obstacles of the outcome embedding, between the design professionals and the business ones, to the entrepreneurial universities and the private partners' interaction. In fact, we discussed how co-creation techniques, co-design, visualisation and rapid prototyping can function as cross-sector boundary objects (Carlile, 2004; Feldman & al., 2006, Corsby & al., 2010) in the cross-sector boundary group formed by entrepreneurial universities and private partners. A new category was introduced in the entrepreneurial university-industry outcome embedding: inspiring through prototypes and visualisations.

Although this study can serve as a first attempt to apply design techniques towards the outcome embedding for cross-sector collaboration, with a focus on the entrepreneurial university-private partner's interaction, some limitations are to be considered. First, this study was carried out with entrepreneurial researching and teaching institutions that are active in the field of design thinking and design doing. A future study should consider another pool of entrepreneurial universities and undertake the same approach to compare the results. Second, a user test and another co-creation session should have been carried out to double validate the results obtained with the first one. Finally, a quantitative analysis or parallel sessions involving many more stakeholders is suggested. In fact, due to time limitation and available resources only a small sample was selected, whereas for cross-sector collaboration studies a broader range of stakeholders can enrich the results obtained.

To conclude, we believe that this work can be a great inspiration for practitioners. The *design it together* platform can be a model for entrepreneurial universities and private partners that look at building a structured, engaging and open platform for outcome embedding. In addition, the platform has a strong focus on the *doing* and the use of *design tools* and *techniques*, considering them as means to transcend the stakeholders' barriers and obstacles. To our understanding, the application of these methods can be useful to create successful cross-sector collaboration also between different domains, such as corporate-NGOs, public-private partnerships, and complementary businesses. The use of design methods as cross-sector boundary objects can inspire and act as enabler for new cross-sector boundary groups (e.g. foundations) that look at creating new enthusiastic and successful cross-sector boundary experiences.

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Author Biographies

Baldini Luca

I come from Rome, where I developed my interest for Arts, Aesthetic and Function. I did my Bachelor of Art in Product Design at the High Institute for the Artistic Industries of Rome (ISIA Roma Design). There I could learn how to combine products and services into a synesthetic experience, involving graphic design, branding, service design and meta-design. After completing successfully the BA, I moved to the Netherlands to pursue the Master of Science in Strategic Product Design at the faculty of Industrial Design

Engineering of Delft University of Technology. In the past 2 years and a half I investigated the different perspective on innovation and strategy applied to the product-service-user interaction. During this time, I also had the opportunity to move to Paris for 7 months where I worked for one of the most successful branding, digital and storytelling agency in France. Thanks to both Dutch and French experiences, I steered my interest towards the digital design and the service design world, including the cooperation between different stakeholders thanks to Design Thinking and Design Doing. This is the first paper I wrote and it is part of a broader and more extensive work done during my MSc Thesis.

Calabretta Giulia

I was born and raised in Italy, where I developed my creativity, curiosity and sensitivity for different aspects of design. I decided to cultivate my inclinations in a business context. Thus, my background and career before TU Delft are in the fields of management and marketing. I graduated in Business Administration (minor in Marketing) at Bocconi University in Milan, with a thesis on how iconic fashion designers transfer their stylistic identity into recognizable brands that survive

designers' work life. I then moved to Barcelona, where I got my PhD in Management Science from ESADE Business School. My dissertation studied market acceptance of sustainable technology, with focus on the role of product design. After a two-year Post Doc at BI Norwegian School of Business (in Oslo), I joined TU Delft for doing research on the strategic role of design in companies' innovation strategy. Over the years I have also been doing some freelance consulting in marketing for education institutions.

De Lille Christine

Christine De Lille is an Assistant Professor at the Delft University of Technology, the Netherlands.

She investigates 'Designing User-Centered Organisations' with a focus on the practice of small to medium-sized enterprises (such as Difrax, Bammens and Alrec Displays), supporting organisations (such as the Dutch Chamber of Commerce and Flanders InShape) as well as the aviation industry (for companies such as KLM, Schiphol Airport and Zodiac Aerospace). Main areas of her work include service design and user-centred design, and how a user-centered perspective impacts and transforms organisations. Christine is a member of the Design Research Society, co-founder of its Design Management Special Interest Group, and organizer of various conferences (such as Mobile HCI 2008 and IASDR 2011). Christine De Lille lectures primarily in the MSc. programmes 'Strategic Product Design' and "Design for Interaction" at her faculty in Delft, and is also a frequent guest speaker to other universities and schools as well as various networks in practice, such as the Dutch Design Management Network.