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Suspense as a Driver for University-Industry Collaboration

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The rise of shared global challenges has increased the importance of joint innovation efforts. University-Industry Collaborations (UICs) represent an underexplored opportunity for multi-company initiatives. This article explores how universities can adapt their collaboration offerings toward industry partners so as to better facilitate innovation ecosystems. An empathic design approach was used to examine X!Delft's ecosystem – part of the valorisation centre of the Delft University of Technology. This revealed one underlying emotional driver of industry partners for participation, namely a shared sense of 'suspense' regarding future (technological) developments. Hence, a framework was created to stimulate enduring engagement by cultivating effective suspense.

Keywords: suspense, university-industry collaboration, ecosystem innovation, emotional driver, strategic design

INTRODUCTION

The increasingly competitive market and the knowledge economy have made university-industry collaborations (UICs) an increasingly appealing instrument for companies to remain innovative and for universities to remain relevant and connected. However, in light of interconnected issues and global challenges, the necessity for knowledge co-production by multiple actors from different industries has become more prominent (Jones, 2015). Such is apparent from the popularisation of open innovation and innovation ecosystems. Both UICs and innovation ecosystems are partnerships aimed at boosting innovative performance, but innovation ecosystems focus on collaboration and knowledge co-production, whilst UICs seem to focus predominantly on knowledge transfer and exchange in bilateral agreements. As recognised in the EU's Smart Specialisation Cohesion Policy, innovation in this era of complex systems requires "openness and engagement with everyone" (European Political Strategy Center, 2016: 3). The role of universities herein is amongst others to "build, within the academic setting, cross-disciplinary and open meeting places, where fresh opportunity and ideas can thrive" (ibid: 12). UICs could thus benefit from adopting an innovation ecosystem approach that facilitates knowledge co-production and joint projects with multiple industry partners.

The design project presented - which is based on the master's thesis by the first author (Levrouw, 2020)-considers this topic, as well as the drivers that would motivate an industrial partner to join such a UIC innovation ecosystem. This is done through a case study of X!Delft. X!Delft is an organisation within Delft University of Technology (TU Delft) aiming to 'innovate together' in a network of scientists, startups, students and corporations. X!Delft was founded in 2019 in collaboration with strategic consultant Roland Berger as part of TU Delft's aim to structure strategic partnerships with industry to impact society through innovations by engaging in active co-creation and realisation (TU Delft, 2018). X!Delft contributes to this objective by establishing an ecosystem in which multiple partners collaborate to innovate in service of addressing complex (e.g. global) challenges (X!Delft, 2019).

The paper is structured as follows. First, the chosen approach and its steps are briefly introduced. This is followed by a description of the respective outcomes per step. This results in a framework reshaping UICs and specifically X!Delft, by responding to the underlying driver of industry partners and amplifying the benefits of collaborating with corporations and other actors. The paper then concludes with remarks and suggestions for further development.

APPROACH

The aim of this project is to develop a collaboration structure for UIC innovation ecosystems. To that end, the underlying drivers of industry partners need to be identified and assessed. Such warrants the choice for a design approach. A process similar to the 'double diamond' was followed, as first formulated by the Design Council in 2004, in which the first diamond focuses on the problem definition, and the second on solution-finding (see Figure 1). Each diamond is divided into a divergent phase, in which the subject is explored in breadth and depth, and a convergent phase, in which concrete actions are formulated and undertaken - hence forming diamonds (Design Council, 2020).

In the discovery phase, the context of multilateral UICs is explored through literature and the case study of X!Delft is introduced. The findings from this case study are then converged in the define phase. This is done in two stages, the first one aims to arrive at shared innovation challenges and the second one identifies the shared underlying driver. This underlying driver is subsequently further developed within the second diamond, to explore potential avenues for solutions. Lastly, a solution is delivered and validated within the X!Delft ecosystem. The Double Design approach as presented is here used as a structural basis for the article.

FIGURE 1
DOUBLE DIAMOND DESIGN APPROACH ADAPTED FROM THE DESIGN COUNCIL (2020)
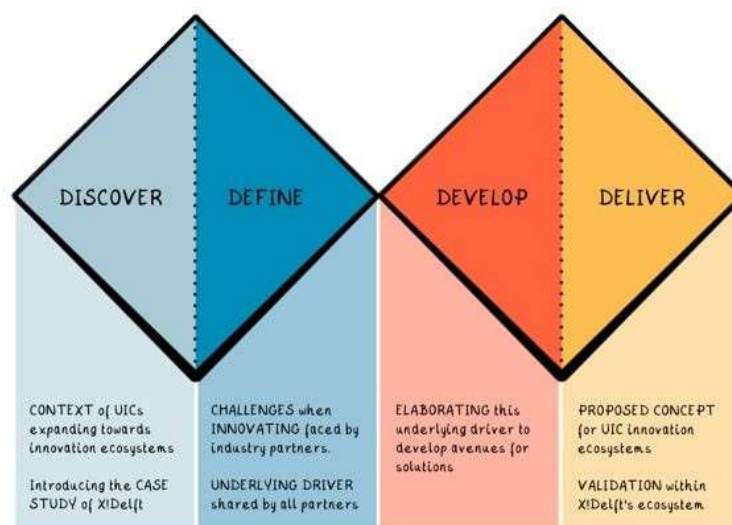
DISCOVER

Context

In a Knowledge Economy, where knowledge is essential in the creation of new goods and services, universities play a crucial role in innovation through the facilitation of knowledge and technology transfer towards industry (De Fuentes & Dutrénit, 2012; Etzkowitz & Leydesdorff, 2000; Inzelt, 2004). This interaction between universities and industry is part of the Triple Helix Model. The Triple Helix thesis states that the potential for innovation and economic development in a Knowledge Society lies in the creation of hybrid institution formats (consisting of universities, industry and government) for the production, transfer and application of knowledge (Etzkowitz & Leydesdorff, 2000). Through UICs, industry and universities are reacting to the government's call to collaborate in favour of innovations that benefit society economically or socially.

The literature on UICs predominantly focuses on knowledge transfer from university to industry (unidirectional) and exchange (bidirectional) between both parties (Schienstock & Hämäläinen, 2001; Ankrah & Al-Tabbaa, 2015). To align both parties, projects are detailed in advance, resulting in a problem-oriented dialogue aimed at finding applications for knowledge and technology (Jacob, Hellström, Adler et al.; 2000). However, the Knowledge Economy has marked an era in which knowledge and technology are not merely transferred, but jointly created in a collaborative process (ibid). This shift is also visible in the increased amount of joint patent files (Borowiecki, Guimon, Paunov & Planes-Satorra; 2019), moving UICs further away from sponsorships towards partnerships (Jacob et al., 2000). Moreover, the traditional problem-oriented dialogue generated some disadvantages for both parties in the collaboration. For example, project-specific partnerships mean a limited ability to build bridges between similar projects or to find resources to build a shared knowledge base because of property rights. Therefore, to enable joint knowledge creation in UICs, continuous dialogue with ongoing social interactions between partners during the timespan of the collaboration is crucial (Jacob et al., 2000).

The shift towards a Knowledge Economy, and the accompanying transition of UICs from sponsorships to partnerships, exhibits the stability sought through UICs. In collaboration theory, engaging in inter-organisational relationships is described as a strategy to deal with an uncertain and unpredictable environment to arrive at predictability and dependability (Oliver, 1990). With the increase of complexity and interconnectivity of challenges as well as solutions, conditions are created that surpass organisation-centred change but demand the commitment to future betterment from multiple stakeholders (Jones, 2015). Hence, "access to research network involving other universities and companies, as well as the potential of more complex collaborations in the form of consortia involving multiple firms, universities, and other collaborations are motivations for industry partners to enter into collaboration with universities. (George et al., 2002)" (Ankrah & Al-Tabbaa 2015: 394). Therefore, it is interesting to explore how UICs might be reshaped to facilitate multilateral agreements enabling universities to take up the role of creating contamination spaces, or catalysing peer-to-peer exchange (Runeson & Minör, 2014; European Political Strategy Center, 2016). Such multilateral agreements already exist, such as the FENIX program (now Center for Business Innovation) and EASA in Sweden (Jacob et al., 2000; Runeson & Minör, 2014).

These expanded collaborations progress UICs towards innovation ecosystems, defined as "the evolving set of actors, activities, and artefacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors" (Granstrand & Holgersson, 2020: 3). However, what seems to be missing in the literature is insights into the motivations and drivers of industrial partners to engage in multi-partner collaborations in which the gains in innovative performance are applicable to more than one actor, and the partnership surpasses knowledge transfer to make room for knowledge co-creation.

Case of X!Delft

In order to discover the drivers from the side of the industry, a case study was performed within the context of an early example of multilateral collaboration. X!Delft (TU Delft) is building an innovation ecosystem in which partnerships are established before concrete projects are specified, leaving room for

broader and more open innovation initiatives. Currently (spring 2020), their innovation network consists of ten industry partners from a wide range of industries, academics, four field labs, the YES!Delft incubator, Delft Entreprises startups and a network of 180 students. New connections are enabled by offering companies a central point of entry to navigate the expansive collaboration opportunities within TU Delft, as well as by new ways of working together via X!Delft specific services. It is X!Delft's vision that by having a network with a larger group of partners with open innovation agendas, they could slowly create an innovation ecosystem as mentioned above.

Although industry partners find this promise interesting, little joint activities are currently taking place, because of the difficulty in finding project scopes that suit multiple partners, as well as the openness this peer-collaboration requires. There seems to be missing a clear understanding of the shared motives and drivers of the partners that could be of help to reshape X!Delft's proposition to respond better to those interests.

To create this understanding, eleven interviews were conducted with six X!Delft industry partners, allowing in-depth insights into their needs whilst being accessible within the time frame available for the graduation project of the first author. The participants were chosen by Zwanet van Lubek, a member of X!Delft's management team, with sufficient diversity in terms of company, function and relation to X!Delft (see Figure 2).

**FIGURE 2**
LIST OF PARTICIPANTS

INDUSTRY PARTNER	PARTICIPANT
Company A	P1
	P2
Company B	P3
	P4
Company C	P5
Company D	P6
Company E	P7
	P8
	P9
	P10
Company F	P11

The interviews were semi-structured and followed an interview guide in which the main questions included background information, innovation processes, collaboration in innovation and, more specifically, with X!Delft. The exact questions depended on the profile of the interviewee, as they had varying knowledge on, amongst others, the partnership with X!Delft.

DEFINE

In order to converge all the data gathered throughout the interviews into meaningful insights and subsequently into a shared driver for participation, the interviews were analysed using a coding process identifying relationships between the interviewees' responses (CESSDA Training Working Group, 2017-2018). This was done in two stages, the first four steps aiming to arrive at challenges regarding innovating. Then, step five served as a final converging step in which a deeper emotional driver was sought that could be identified across partners (Figure 3).

FIGURE 3
ANALYSIS PROCESS TOWARDS INNOVATION CHALLENGES AND THEIR SHARED UNDERLYING DRIVER
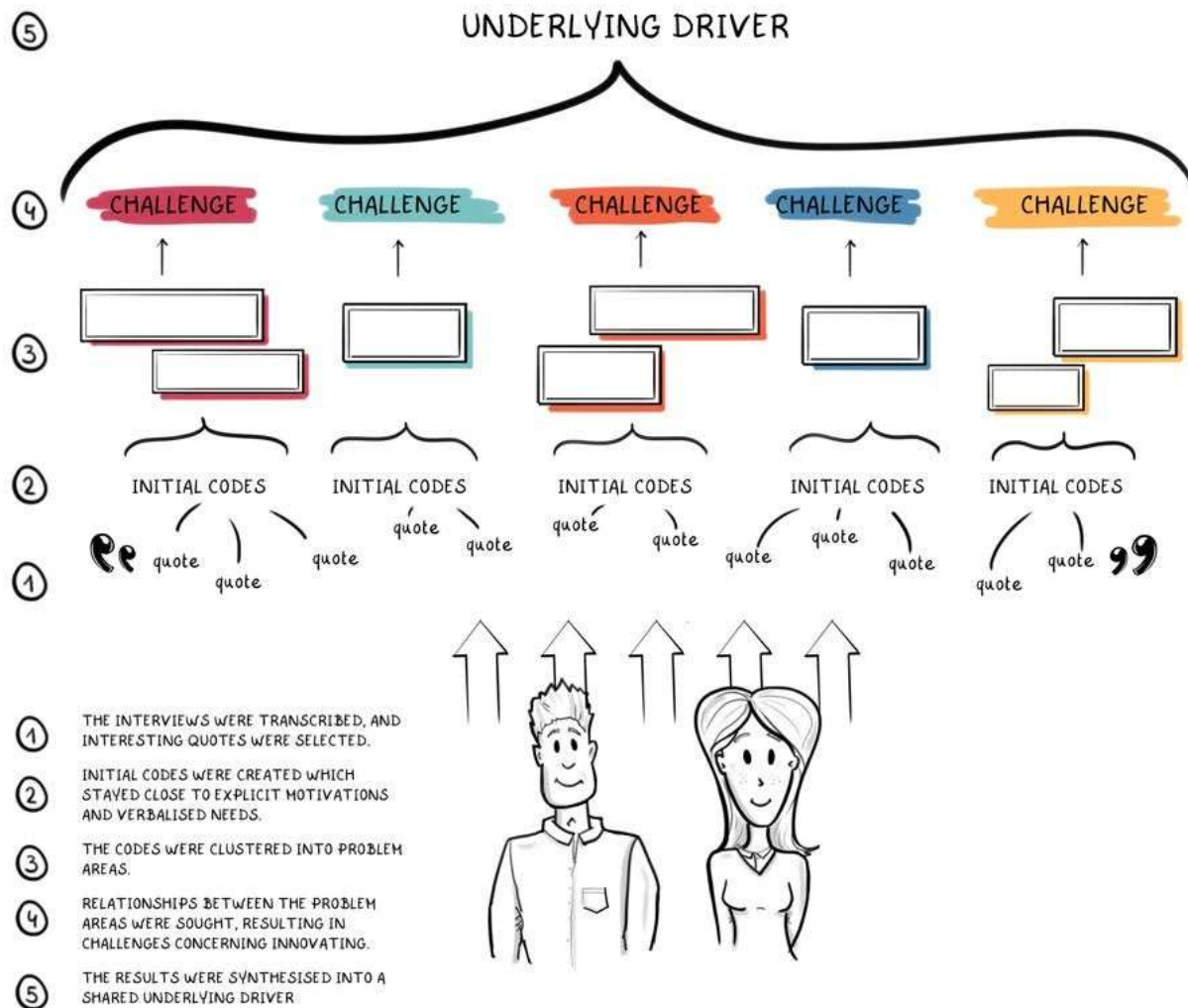
Besides the interviews, informal conversations were held with X!Delft employees concerning partners' motivations to join the network, and a three-hour creative session was held with eight innovation experts from X!Delft and an innovation scientist from TU Delft to discuss their insights into the innovation challenges partners face. During the conversations and creative sessions, templates were filled in that were used to document and subsequently analyse the data.

Stage 1: Innovation challenges

X!Delft partners are motivated to set up the partnership when the strengths of the TU Delft can contribute to the strategic challenges they experience (P2). They expect to tackle certain innovation challenges through the partnership, which can be summarised as the following five: Fear Of Missing Out (FOMO), balancing FUTURE needs with those of today, internalising new technologies into the FLOW of the company, finding FAMILY members with similar challenges to collaborate and stimulating human creativity and FUN.

FOMO

"How can we [spot] underlying trends or underlying currents in science that we as a company cannot yet see?" (P7).

Companies experience a 'fear of missing out'(FOMO) when seeking to identify the value that existing and emerging technologies could bring to their business, today and in the future. A university has a broad range of expertise and is always on the lookout for long-term technology. Through UICs, partner companies step in earlier in the development process of new technologies and knowledge. Especially "where the innovation is very small, it is nice to have a partner to which you can go with your innovation questions. Who can think along, have extra resources at their disposal, but also knowledge and expertise." (P11). This also allows companies to stay true to their core while keeping up with changes by attaching partners with relevant expertise. Partners thus expect X!Delft to link a broad array of technological developments happening in TU Delft to their business, to set up experiments for new business.

Future

One of the core issues in innovating is balancing the need to generate business today, with preparing for the business opportunities and challenges of tomorrow. "Companies are often judged on short-term results, which conflicts with innovation" (P10). Innovations for the long run are difficult to work into a system of Key Performance Indicators that are formulated for short-term returns (P7). This need to act today to solve future challenges is ever more important, as the world is changing quickly and "you can't do the same thing for ten years and it will be okay, no, in a few years the world and your business model will be different. You will need to use a lot more of your resources to respond to that." (P10).

Investing in a partnership with X!Delft addresses this, as the focus on long-term research makes a university well-suited as a partner to prepare for the future: "at a university, there is often way more fundamental research conducted. So from the partnership with X!Delft I mainly expect way more inspiration for the distant future." (P7).

Flow

This is a challenge about internalising new technologies, whether as product/service innovations or as part of a new process. Integrating innovation is complicated by culture, processes and internal structures, restricting innovation more often than facilitating it (P2, P3, P4, P7). These challenges include keeping an external perspective, involving users in creating and validating new propositions, and shortening the duration of an innovation project: "Because our trajectories take quite long, you notice naturally that at a given time our project becomes more internally focused and before you know it is one year later, and the world around us has changed and you still don't know whether the project is going to succeed or fail." (P5). To counter these issues, companies experiment with new ways of working. However, implementing new ways of working to create an innovative company "is also a culture change. We have a lot of visions and mission statements about being consumer-centric, but we still have a culture in which we formulate the problem and requirements ourselves." (P2). Through a partnership with X!Delft, these partners can experiment with new ways of innovating, gaining a new perspective on possible alternatives for their ways of working.

Family

"Ideation with people from the company only does not yield creative ideas. People are in their own reality, today's reality." (P7). The appeal of an ecosystem where both companies and academics are able to provide a fresh pair of eyes is thus apparent; a 'family' can help to tackle some of the challenges in a company's 'flow'. In accordance with interviewee comments, such a 'family' would be particularly well-suited to tackle innovation issues shared by other X!Delft partners. Not only did interviewees mention there might be individual problems other partners recognise, but also that there might be opportunities to respond to shared, societal issues: "How can we, bluntly said, decrease the carbon footprint of the Dutch market." (P7).

Fun

Relating to the human excitement for novelty and discovery, this search for a pleasant innovation journey is closely linked to the new way of collaborating X!Delft propagates. Partners find it challenging to balance safeguarding results, with stimulating excitement and engagement in innovation projects, e.g. through an innovation lab. "If you say that everything is possible here, then people will do it just for fun and we don't want that. But if they are intrinsically motivated to start a project, and they have arranged with their boss to get the time off, then they already went through a long internal process and really want to do this." (P3). Alternatively, employees might be granted autonomy in the undertaking of new innovation projects: "I only ask them some critical questions, because actually, we want to capitalise on the fact that people are enthusiastic and want to experiment." (P1).

Stage 2: The Underlying Driver

When observing the interview findings, the 'uncertainty' implied in the literature - as a result of rapid technological change - can be identified across the challenges. Uncertainty then pertains to which technologies are being developed (FOMO), the value they could add to their business in the FUTURE– and how these technologies could be integrated into their organisation (FLOW). However, although companies might feel resistance towards change, humans enjoy discovering and exploring new solutions in a joint fashion (FUN & FAMILY).

As originally conceived by the first author (Levrouw, 2020), there is thus an element of excitement in this uncertainty. Hence, taken together, the term *'suspense'* is introduced in this context. *Suspense* can be defined as "a state or feeling of excited or anxious uncertainty about what may happen" (Oxford University Press, 2019), capturing the interesting tension between the anxiety and excitement that uncertainty brings. The five challenges mentioned above are then regarded as manifestations of the underlying suspense.

FOMO, FUN and FUTURE generate suspense, while FLOW and FAMILY can hinder or facilitate successful management of suspense (Figure 4).

FIGURE 4
**THE INNOVATION CHALLENGES SEEN AS MANIFESTATIONS OF SUSPENSE**
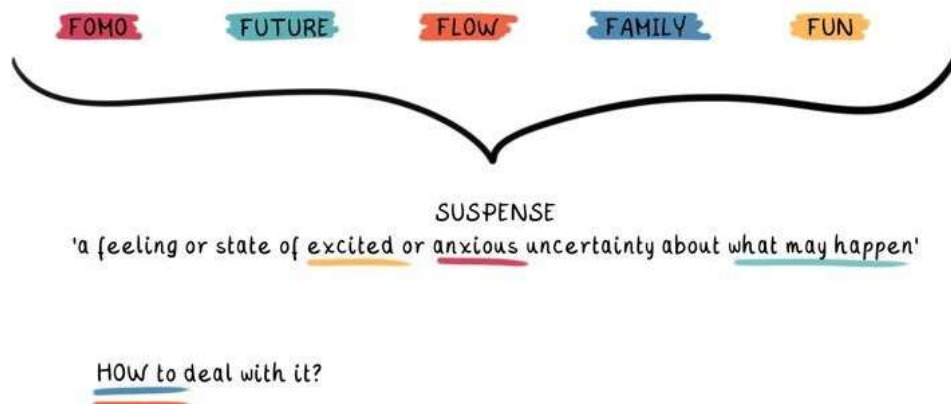
These challenges can be seen as requirements for the innovation ecosystem of X!Delft. To put these in one sentence: it should soothe FOMO by 'disarming' upcoming technologies, prepare for the FUTURE by experimenting with new collaboration methods to improve the FLOW and stimulate FUN, in which we can learn from each other as a FAMILY. Moreover, the underlying emotional driver of suspense should be addressed, in order to create a proposition that genuinely connects to the industry partners.

DEVELOP

The underlying, emotional driver 'suspense' was explored and elaborated upon to provide a rich base for understanding and responding to the industry partners' needs through the partnership with X!Delft. Additional literature was sought to elucidate the underlying driver as formulated in the define phase. From there, a creative process started aimed at consolidating these insights into a coherent framework for the creation of UIC innovation ecosystems.

The literature on suspense discusses the subject mainly as a literary technique in narratives, however, Lehne & Koelsch (2015) have laid the foundations for a general psychological model/mechanism underlying suspense. Suspense arises when an initiating event is presented, potentially leading to significant consequences (Lehne et al., 2015). When this 'initiating event' is perceived, predictions about possible futures are made based on pre-existing knowledge. The divergence between the possible future scenarios and the significance of the anticipated effect contribute to the extent to which suspense is sensed, as visualised in Figure 5 (Lehne & Koelsch, 2015). Moreover, as both positive and negative scenarios are possible, a combination of hope and fear is experienced when anticipating these futures. As time evolves, events are constantly compared to the predictions made, which are then updated to anticipate new events.

FIGURE 5
**THE GENERATION OF SUSPENSE BASED ON LEHNE & KOELSCH (2015)**
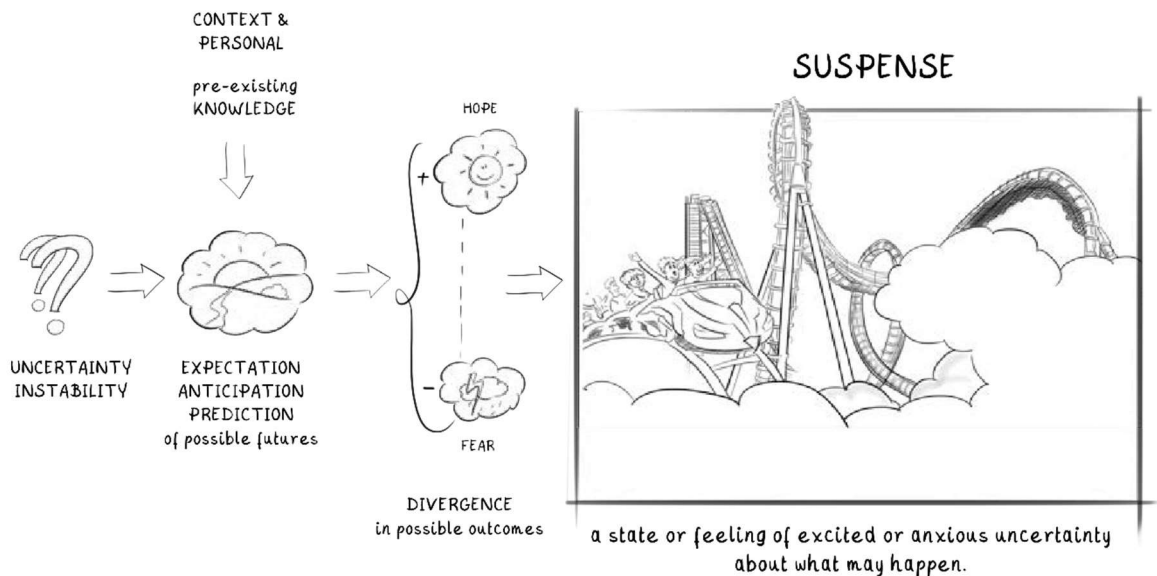
Suspense can be a source of excitement that is not easily experienced when a status quo is sustained. When using suspense as an impulse to act, subsequent activities might result in a more favourable situation than the pre-suspense position (Lehne & Koelsch, 2015). Engaging with suspense can be unpleasant because it is "often associated with situations in which an individual's model of the world (i.e. previous knowledge and expectations) is challenged, providing an environment for learning in which the model of the world is expanded" (ibid: 4). Acting upon suspense can thus elicit an exciting learning process preparing organisations to react appropriately when the future arrives, ultimately leading to novel opportunities for the resolution of suspense on a specific topic. Thus, to make a UIC innovation ecosystem thrive, the goal is not to eliminate suspense, but to cultivate *effective* suspense, which forms an additional requirement for the collaborative structure aimed for in this project (Levrouw, 2020).

As formulated in the work of the first author, suspense is considered to be effective when it incentivises companies to engage in a learning process in order to find a resolution to the initial uncertainty. This is

done through a process of experimentation and reasoning, which accumulates new insights upon reflection, increasing the (collective) knowledge base, decreasing the divergence of possible events and thus improving future predictions and creating a basis for relevant action (see Figure 6). Although the authors are aware of the close relation of this process to the pragmatist inquiry, a direct discussion of such theoretical literature is beyond the scope of this paper.

FIGURE 6
THE SUSPENSE CYCLE, BASED ON THE SUSPENSE LITERATURE, PRAGMATIST INQUIRY AND DESIGN LITERATURE
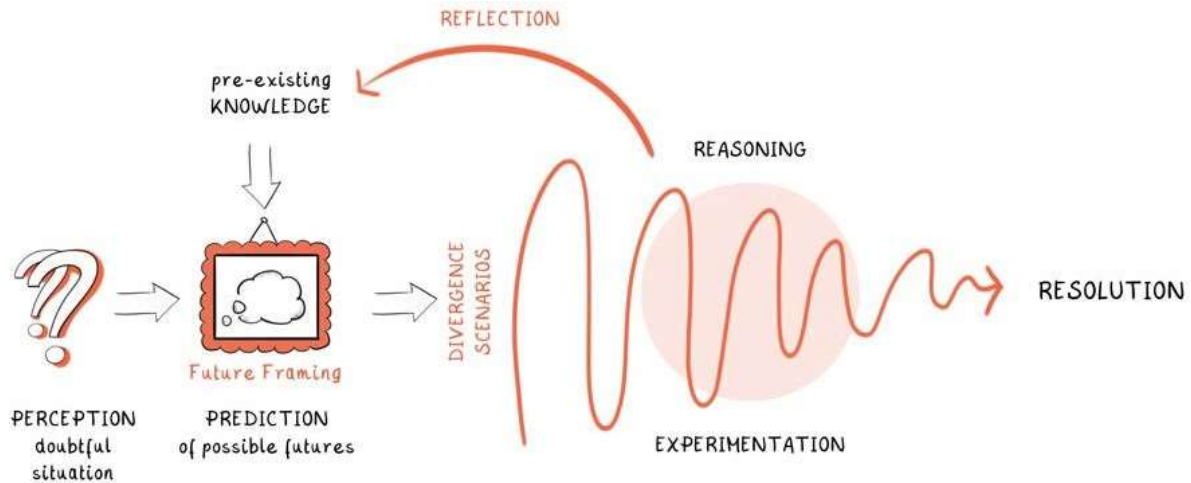
To trigger this continuous exploration and learning, a base level of *general* suspense should be sustained. General suspense (I) is here defined as the overall feeling stemming from the acceleration and the increased complexity of technological change. However, through exploration and learning, *thematic* suspense, revolving around a specific topic (A, B, C), will decrease (Figure 7). Over time, learnings are accumulated on these specific topics, uncovering opportunities for resolution through innovations and collaborations.

FIGURE 7
THE RELATIONSHIP BETWEEN THEMATIC SUSPENSE (A, B, C) AND GENERAL SUSPENSE (I). OVER TIME, THEMATIC SUSPENSE IS GUIDED TOWARDS RESOLUTION.
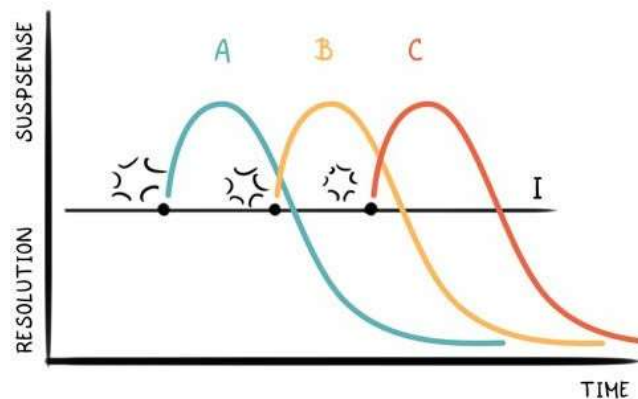
DELIVER

The requirements for the innovation ecosystem, formulated as the five innovation challenges and the cultivation of effective suspense, provided the input for the final phase of the project, Deliver. To understand how to guide partners from uncertainty to actionable future predictions, a process to Preserve and Cultivate Effective Suspense (PACES) is proposed. PACES consists of six overlapping phases (see Figure 8), which can be carried out at the general level of suspense – to identify interesting topics; as well as at the level of thematic suspense – to distil trajectories for innovation around a specific topic. The first three steps focus on gathering input into the ecosystem's shared knowledge base, while the last three focus on the output towards innovations. By reflecting on the output, new input is given to the ecosystem. Together, the six steps cultivate *effective* suspense.

FIGURE 8
THE SIX OVERLAPPING STAGES OF THE PACES APPROACH

To Create Input: Perceive, Perspective and Predict

To cultivate effective suspense, a combination of continuous perception and knowledge sharing is crucial. Enlarging the knowledge base is necessary for inventive creativity, to generate inspiring and plausible future scenarios, and to boost confidence in an enterprise's capability to adequately react to the expected events. Three dominant and partially overlapping activities inform the process of this scenario creation: **Perceiving** multiple sources of input to create a large array of **perspectives** that culminate into scenarios with some **predictive** quality.

The UIC innovation ecosystem as discussed here, forms an appropriate platform to offer a process for such broad and continuous perception, as it connects academics, students, startups and industrialists in one network for innovation. This increases the amount of information that can be collected and decreases the fear of missing out ('FOMO'). For continuous and active perceiving, it is necessary to stay open to new perspectives and possibilities. Sharing the diverse **perspectives** stemming from all partnering stakeholders facilitates the elaboration of future scenarios into plausible and intelligent images of the future that encapsulate **predictions** of future developments. The scenarios synthesise long-term university perspectives and mid-term industry perspectives, forming the basis for projects that aim to create tangible outcomes for the short-term. These outcomes build trust and engagement for long-term involvement around the specific topics and provide input for additional scenarios around other topics. The latter leads to a long-term commitment by all partners in the ecosystem which helps to bridge the horizon gap between university and companies and helps partners to prepare for the FUTURE.

Application of Input: Paraphrase, Probe & Prove

Since these scenarios are co-created within the ecosystem, they add value for multiple partners. The creation process explicitly and/or implicitly incorporates the strategic intent of each company, which informs the role they want to play in the predicted future. From this position, and by 'backlogging'

(reasoning back from the future vision), the scenarios can then be translated or **paraphrased** into actionable directions consisting of multiple collaborative experiments and projects.

These projects are to be seen as **probes** that explore and potentially clarify how the future might relate to each company. This **probing** is an essential process that aims to explore unknown territories still present in the future scenario. The overall aim is to increase learning by intentionally investigating these territories through experimentation around assumptions. Unmet expectations are therefore to be seen as opportunities for further investigations instead of framing these as failures. Thus, the goal of the project must not be formulated exclusively in terms of performance (if at all), but in learnings accumulated over several experiments.

The collaborative setting of these **probing** activities with a diversity of participants unites the academic focus and the business focus, resulting in conceptual as well as practical knowledge. By experimenting in different ways within the ecosystem, the partners experience an alternative way of innovating, sparking excitement (FUN) and offering inspiration to change the FLOW of their organisational processes.

The probing activities yield opportunities for further development, such as PhDs, ventures or new field labs that in their turn aim to further validate and **prove** the innovation trajectories. Tangible innovation concepts resulting from the projects ultimately bridge the gap between suspense on a specific topic at the outset and resolved suspense in the form of integration within the innovation FLOW of the company. In this phase and around that specific topic the university is slowly decreasing its active involvement. Potentially this could lead to an increased involvement of consultant Roland Berger, also part of the ecosystem, to support the industrial partner in strategic choices and organisational adjustments. The application of the PACES approach then continues around other topics as depicted in Figure 7 above, which is believed to cultivate the feeling of suspense as an initiator for collaborative action within the ecosystem.

Validation

The final step concerned a partner validation session, in which participants were asked to reflect on how they related to the notion of suspense, how important each phase in the PACES framework was, and to what extent they thought a partnership with X!Delft could contribute herein. Underscoring the idea of diverse perspectives, the reactions varied greatly per company, and even within companies. However, overall, the partners expressed genuine interest in and enthusiasm for 'suspense' and the presented approach of PACES. This was noticeable through the productive discussions in which they engaged, and the willingness to share their experiences and opinions with others.

CONCLUSION

As the acceleration of technology and the rise of global challenges have increased pressure on most firms and have transformed the competitive landscape, taking joint action to come up with relevant trajectories for innovation has become increasingly beneficial. If the development of new services and systems for the complex and interconnected issues require universities to contribute, as acknowledged in the Knowledge Economy, then there is an opportunity for UICs to be redesigned. Building UIC innovation ecosystems, facilitating multiple industry partners and university actors to take joint action, seems like a promising avenue. This as opposed to bilateral UIC collaborations aimed at proprietary knowledge development and exchange only.

X!Delft, an organisation within TU Delft, aims to create such an innovation ecosystem. A case study among the partners of X!Delft revealed innovation challenges that they aim to tackle in this collaboration. These challenges are treated as five manifestations of an implicit sense of suspense, as elaborated on by Levrouw (2020). The introduction of the term 'suspense' in this context, complements literature's description of 'uncertainty', by adding a factor of excitement and wonder, triggering an impulse to act - and thus creating effective suspense.

To respond to this underlying driver, a process is proposed to Preserve And Cultivate Effective Suspense, in short PACES. By deploying PACES, an 'effective suspense' is created, which incentivises engagement in a learning process. The six overlapping activities of PACES are: perceiving, putting into

perspective, predicting, paraphrasing, probing and proving. A first validation step with partners showed that the idea of 'suspense' and its activity framework of PACES resonates with their intentions to join the X!Delft ecosystem. PACES is currently further developed and a pilot will be run around one of the Sustainable Development Goals of the United Nations, as multiple partner companies recognised certain suspense on this topic.

The creation of an ecosystem in which academics, consultants, students and enterprises collaborate, offers an excellent opportunity for industry partners to cultivate effective suspense, as the participation of different actors enables the broad perception and fresh perspectives needed to create a knowledge base for inventive creativity, aimed at coming up with innovative solutions for the future.

NEXT STEPS

The strategic design project this paper reports on, should be regarded as a first exploration into the underlying needs of corporations to engage in a multilateral UIC innovation ecosystem. A preliminary concept is presented, of which the fundamental building blocks have shortly been validated with X!Delft and their industry partners. Additional investigations should be aimed at further reinforcing the outcomes from this project by active experimentation with the PACES approach and its underlying driver of suspense. If a similar driver of suspense is identified in different contexts, both the theoretical concept and its practical translation could benefit from further elaboration. First of all, when proceeding with the concept of 'suspense' within the context of UIC innovation (ecosystems), more parallels can be drawn to the existing narrative suspense literature. For example, the concepts 'imminence', 'foregroundedness', 'confidence' and 'importance' as discussed in Doust & Piwek (2018), could be used to determine how strongly a partner experiences suspense on a specific theme. This might help to evaluate which topics are putting pressure on industry partners and should thus be prioritised as input for the PACES approach.

From a theoretical perspective, the further development and detailing of PACES might benefit from the literature on pragmatism (e.g. Lorino, 2018), which states that such development requires co-creation with all stakeholders. Such will increase ownership, engagement and ensures a close fit with underlying industry and university needs.

For example, in order for UIC innovation ecosystems to contribute to universities' Third Mission of impacting society, it needs to be researched how the innovation potential created in the ecosystem can be translated into implemented innovations - as this seems to be a persistent challenge in innovation projects. The challenges in successful implementation include amongst others absorptive, collaborative and entrepreneurial capacity.

Overall, the collaboration between universities and industry in the form of a multilateral UIC innovation ecosystem seems a promising avenue to align a diversity of strategic intents of industry partners through the underlying and pre-competitive driver of suspense. Hopefully, the further development of UIC innovation ecosystems as described in this paper will be capable of turning the Triple Helix into a vibrant and collaborative ecosystem of innovating partners.

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