The journey of two inventors toward a start-up; how their research for a systemic innovation method helped in stakeholder interaction

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Abstract. This paper explores how two inventors did research on the T-shaped presentation model to support systemic innovation. The original research question was how the T-shaped presentation model adds value to start-up inventors' presentations when targeting stakeholders.

The initial assumption is that entrepreneurs are usually ill prepared for presenting to stakeholders outside their field of interest. The two inventors used the industry-as-laboratory approach, a variant of action research. They used questionnaires and in-depth interviews to evaluate the impact of T-shaped presentations. Employing the T-shaped presentation tool helped the inventors to learn from mistakes and to identify knowledge gaps in their presentations based on feedback and own impressions and observations. This learning outcome triggered the inventors into searching and generating knowledge to produce the required information and to target stakeholders appropriately. The inventors conclude that the T-shaped presentation is indeed a valuable and effective tool for inventors and entrepreneurs. The model should, however, be used with care as it is not a template, it must be adapted to suit each inventor and each stakeholder. This paper concludes that the academic mindset required for research triggered a learning process that helped the inventors in their transition from inventors to entrepreneurs.

Introduction

Educational context.

The systems engineering master program at the University of South-Eastern Norway uses a half-year full-time master project as closure for the program. The students apply and evaluate a method or technique from the systems engineering body of knowledge. The systems engineering research group uses the aggregation of these master projects as way to research and validate the body of knowledge (Muller 2009, 2012, Muller and Falk 2018).

The research approach for these master projects is industry-as-laboratory (Potts 1993, Muller 2013). In this variant of action research, the researchers emerge in the working environment to observe the way of working and the impact of methods or techniques that they introduce. For the sake of objectivity, the researchers have to be aware what they do in what role; as researcher they observe and analyze critically and independently, as industrial employee they are result focused and often subjective. In the preparation of this project, the academic staff emphasizes the distinction of both roles.

Research context.

This paper describes the journey of two students doing their master project in their own startup company, where they intend to commercialize an invention they have made. The inventors have worked in the offshore industry for many years. During the past seven years, they have been studying systems engineering part-time at master level.

During the project, the students struggled with the role separation between inventor/entrepreneur and researchers. They observed that the researcher role impacted their inventor and entrepreneur

role in a positive way. In this paper, we show what happened during the research project and how the demands for an academic approach helped in the transition from inventor into entrepreneur.

Domain. The research takes place in a business startup and incubator environment in Norway. Running a technical business startup is much about communicating and reasoning about the business case of the invention towards stakeholders. A typical communicating and reasoning setup is business presentations conducted in meeting rooms.

The research followed a startup company targeting motion control systems for WROVs (work, remote operated vehicle). A WROV is an unmanned subsea vessel that is normally controlled topside. Within the oil and gas sector the WROV performs its work tasks with its cameras, manipulators, and related tools.

Company. The two researchers founded the startup business, which does not yet have any employees. The company's head office is a meeting room in one of the founder's home. The startup business does not have process charts, description on work methods or similar guidelines for way of performing work, nor does the company have the financials to start the development forming the product yet. The company's founders have more than 25 years of combined experience working in the WROV industry.

Problem statement. Despite strong government incentives, successful innovation is difficult for technical inventors. Technical inventors are not yet entrepreneurs and are new to entrepreneurship and business startup. One challenge is that technical inventors tend to be narrow-minded when it comes to business startup that needs to run multi-disciplines successfully in a marketplace beyond their own pride associated with the invention (Amesse et al., 1991, Drucker, 2014) and they easily find themselves struggling when communicating and reasoning about their invention and startup opportunity towards stakeholders. In the view of evolutionary theorists, the personality is neither necessary nor sufficient during the convergence from technical inventors to startup entrepreneurs (Sarasvathy, 2009). However, what matters is the business variations created to be selected to be or not to be a survivor by the stakeholders. Stakeholders may be technicians or engineers, financial controllers or investors, marketing managers, development managers, commercial managers, etc. It can also be potential sub-suppliers, business partners, government founding parties, such as Innovation Norway, etc.

Business startups face many uncertainties, unknowns, and ambiguities. Furthermore, when dealing with inventions, the technical start-up period can be categorized as time critical. The situation relates to VUCA (Bennett and Lemoine 2014). Eling and Herstatt (2017) coin the term frontend of innovation preferring this above the term fuzzy front end that Koen et al. (2001) uses. The presentation setting is a good arena for business case validation and generates valuable knowledge needed by inventors when navigating through the "fuzziness". The inventors must, therefore, be able to target the specific stakeholders appropriately when performing presentations.

Identified need. Technical startup entrepreneurs need an instrument view for communicating and reasoning about their business and invention when interacting through presentations with the variety of stakeholders during the startup phase. The expertise studies may apply to this case that certain communication expertise from the past may explain the success (Gardner, 1995, VanLehn, 1996), however the fact that an experienced technical inventor who won a medal of new product competition does not automatically guarantee a win in the marketplace; and a novice technical inventor may succeed in his/her very first startup pitch. What makes this study is of inventor-entrepreneur domain interesting is the iterative learning loops while interacting with the various stakeholders in the fuzzy front end of a startup. The researchers argue that an appropriate communication tool will help target the variety of stakeholders in accordance with their specific interest when performing presentations.

Proposed solution. The T-shaped presentation model is a communication and reasoning tool with a low threshold for use. In this specific research, the researchers have observed how the T-shaped presentation model performs as a tool for inventors presenting, communicating, and reasoning about their business case and their technical invention towards stakeholders.

Research questions

During the research, the researchers employed the following research questions:
Main Question. How did the T-shaped presentation model add value to presentations targeting stakeholders?
Sub-questions.

1. How did the T-shaped presentation model add overall value to presentations targeting stakeholders?
2. How did the T-shaped presentation model influence the inventors' reasoning when targeting stakeholders?
3. How did the T-shaped presentation model contribute with appropriate subject matters when targeting stakeholders?
4. How did the T-shaped presentation model contribute to correct in-depth subjects when targeting stakeholders?
5. How did the T-shaped presentation model contribute to the inventors' realization aspect?
6. How did the T-shaped presentation model contribute to the inventors' stakeholders' management?
7. How did the T-shaped presentation model contribute to inventors' learning capabilities?

Research Methodology

The researchers have performed "in field" action research investigating the T-shaped presentation model employed by the inventors when targeting stakeholders. In the presentation setting, both inventors took an active part. During the presentations, the inventors acted on behalf of the startup company, while observing the situation both as entrepreneurs and as researchers. Soon after finishing a presentation, the inventors discussed and logged impressions and observations jointly. The researchers used two surveys to collect research data. Both surveys contained questions that linked to the research questions:

1. Post presentation survey: Targeting stakeholders soon after the inventors had performed a presentation. Collecting data on the inventors' communication and reasoning abilities with regards to their business case and invention.
2. Innovasjon Norge, a governmental funding company: Collecting data on how the average, freshly started entrepreneur performs in a presentation setting when communicating and reasoning about their business case and invention.

In addition to the surveys, the researchers performed in-depth interviews with three senior personnel working in close relation with entrepreneurs. The three interviewees were employed in three different organizations. All of them were representing the business aspect, two of them from acclaimed Norwegian incubators, the third from Innovasjon Norge.

The surveys mostly use questions with a 5-point Likert scale (Likert, 1932) to get insight in qualitative aspects. In general, this research has too few respondents to justify any hard claim nor to apply any statistical analysis. The researchers have used their collected impressions and observations, data from surveys, and interviews to analyze, discuss and answer the research questions.

The T-shaped presentation model

It has been a long tradition in systems architecture of viewing the multi-disciplinary communication from technology discovery to business performances. The T-shaped presentation model originates from Muller's Gaudí project[1]. The course on Conceptual Modeling (Muller, 2015) requires a T-shaped presentation as final submission. The T-shaped presentation builds on the CAFCR+ model

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[1] Gaudisite.nl

(Muller 2004), linking the technical concerns to the broader stakeholder context providing a business perspective (Muller 2011).
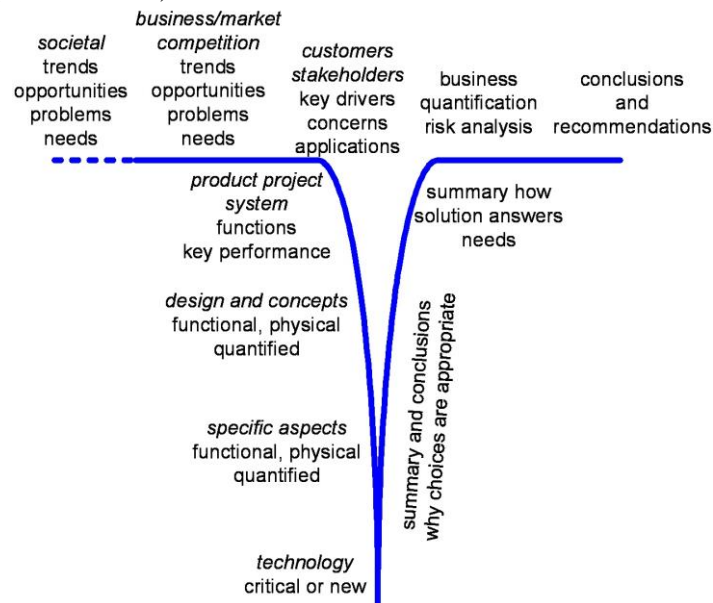

Figure 1: Muller's T-shaped presentation Model.

The T-shaped presentation model connects the profound and crucial technical solutions towards the customer and life cycle context. It focuses on a logical build up that takes the stakeholder on a journey from the opportunity and general business aspect, then more in-depth into the solution space and down to the specific technology that makes the system unique. Ascending from the bottom of the "T" focuses on realizing the solutions, differentiating them from the unique and technical to the more generic and answers the requirements/challenges identified at the start. The model attempts to enable more effective communication and reasoning about a technical invention or opportunity towards stakeholders.

Theoretical background

Later research performed by Eling and Corn Herstatt (2017) concludes that the label, Front end of Innovation (FEI), is a good name for the period from identifying an opportunity to a "go/no-go" management decision (Eling and Herstatt, 2017, Koen et al., 2001). Others refer to the same period as the fuzzy front end (FFE). Within our start-up domain, the management "go/no-go" decision relates to securing the funding needed by inventors to start the development process. This can be one, or a combination of several funding sources such as governmental, business angel, investor, or development partner.

Literature describes FEI as a period characterized by chaos. Research also suggests that one of the leading causes of challenges and failures in projects is the lack of stakeholder involvement in the development process (Davis and Radford, 2014).

FEI is a critical phase (Christiansen and Gasparin, 2016, Koen et al., 2001, Frishammer et al., 2012, 2013). It is thus essential for inventors to get the most out of all stakeholder interactions. Research performed by Grégoire, de Koning, and Oviatt (2008) found that in a funding environment, it has shown that during stakeholder interactions, not all arguments are equally important, more important is the way the arguments are presented.

Even though there is much literature related to the importance of stakeholder involvement (Davis and Radford, 2014), how to communicate and reason about an opportunity or invention towards stakeholders has not received the same attention. Tools, methods, and techniques during FFE have been researched (Val-Jauregi and Justel, 2007, Ajamian and Koen, 2002), however, no research points out a communication tool for stakeholder communication during FEI.

Current Entrepreneur's presentation abilities

The researchers created a survey targeting Innovasjon Norge's personnel working in settings where entrepreneurs are required to present their business case and their invention. Table 1: Overview of how the average entrepreneur perform in a presentation setting Table 1 presents the survey result.

Table 1: Overview of how the average entrepreneur perform in a presentation setting

No.:	Question	Very poor good				Very
1	How well would you rate the entrepreneurs' ability to communicate and reason about her/his invention/system?		25%	**50%**		25%
2	How did you conceive the logical line of reasoning throughout the presentation?		25%	**50%**	25%	
3	How well did the presentation target the concerns you know the entrepreneur will meet?		**75%**	25%		
4	The concerns you know the entrepreneurs' will meet and that was covered by the presentation, did you find them comprehensively covered?	**25%**	**25%**	**25%**	**25%**	
5	In your opinion, did you find the entrepreneurs solution relevant for the entrepreneurs' presented opportunity?		25%	**50%**	25%	

Comments to Table 1: The authors were only capable of securing four survey participants. However, written feedback from the survey highlighted the problem that technical inventors tend to be narrow-minded when it comes to business startup:

> "It seemed like the entrepreneur had not made any thoughts towards what was important to communicate during the presentation…"
>
> "(The Entrepreneur did not communicate) Why it is important to solve this problem and to whom it is important. – The context, opportunity, problem, need."

In addition to the survey, the authors performed three in-depth interviews to get an even more profound understanding of the problem. During the interviews, the three interviewees shared their experience related to the problems that the general entrepreneur face, and elaborated on the challenges they see entrepreneurs are least prepared for. The interviews provided the following quotes:

> "Some struggle with the ability to learn. They tend to focus on what they are good at but lacks focus on what they are not good at, business development being one of them" – Innovation Norway, Senior Advisor.
>
> "They are very focused on their idea and not so focused on the business aspect. Building a team for instance - No idea is better than the team that will put it into life…those who succeed are aware that what they communicate is of interest to the stakeholder" – Incubator Y, Business Developer.

The interviews and survey feedback gave the researchers better insight into the main problems. It also provided the researchers with the opportunity to compare their performance towards other entrepreneurs performing stakeholder presentations.

Applying the T-shaped presentation model in the start-up business

The inventors used the T-shaped presentation model as a guide when generating and conducting presentations targeting stakeholders. Figure 2 presents an overview of how the inventors generated T-shaped presentations. From the start, the inventors spent time developing their business case and invention. During this work, they had an ongoing iteration process where they discussed and analyzed challenges and risks, selected concerns, linked concerns to stakeholders, and generated T-shaped presentations. As Figure 2 shows, this iteration process made the inventors move between all stages from 'Develop business case & Technical invention' to 'Generate T-Shaped

Presentations'. When they had a thorough understanding of their business case, technical inventions, and related challenges and risks, they, based on their current knowledge, identified their top concerns. With an understanding of their top concerns, they linked the concerns to stakeholders and selected whom to target with a presentation. Stakeholder availability did also play a role in whom the inventors were able to target with a presentation. However, after a scheduling a meeting, the inventors spent more time generating views, models, and information to PowerPoint slides and structured the order of the slides, targeting said stakeholder.

The T-shaped presentation model in its original form guided the inventors towards deciding on subjects and the order of presenting the information. When in a presentation setting, before starting their presentation, the inventors encouraged the participating stakeholders to ask questions and make comments as soon something "popped up in their mind".

During the presentation, the inventors used their impressions, observations, and verbal feedback as input to their business case and technical invention. The outcome of the meeting decided if the inventors would have a second presentation towards the stakeholder or not. As researchers, they used a post-presentation survey to get feedback on their presentation, communication, and reasoning abilities.

The inventors used the impressions, observations, and verbal feedback for four purposes:

1. Update their business case and technical invention.
2. Update presentation content
3. Evolve the inventors use of the T-shaped presentation model
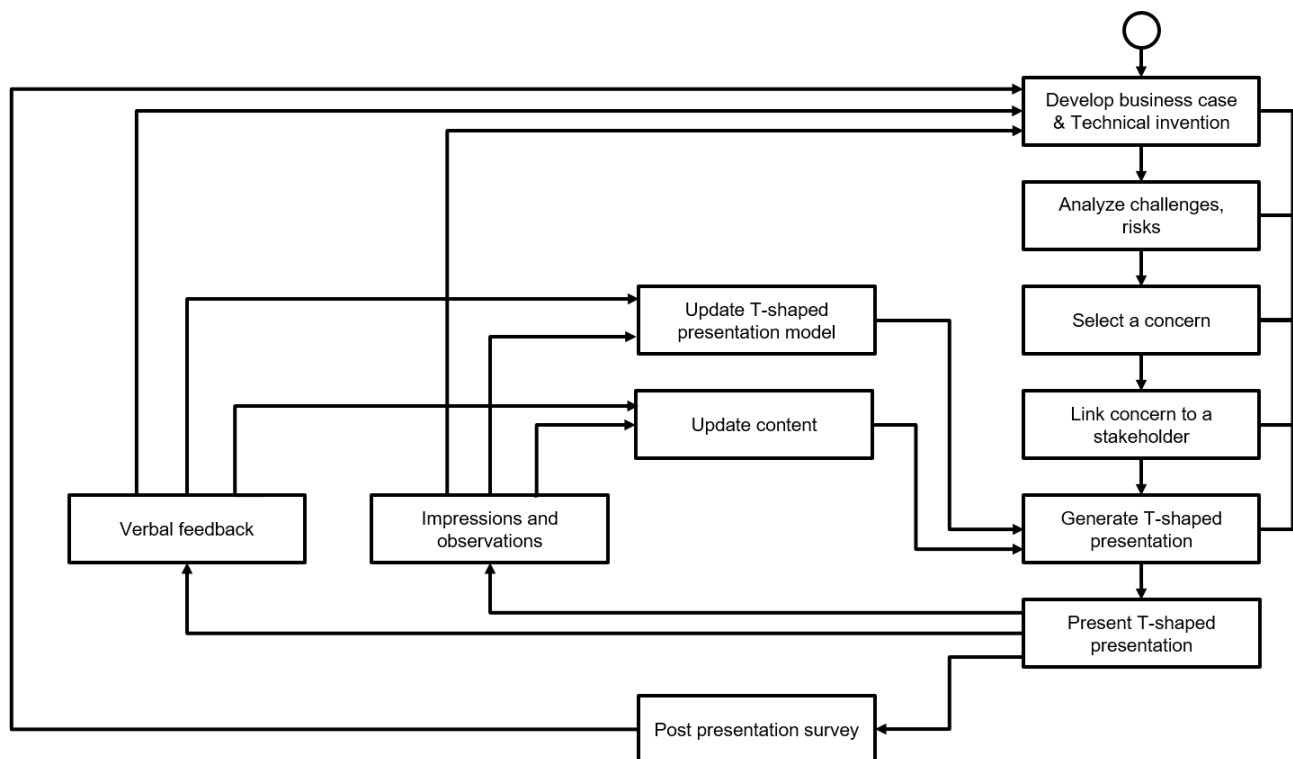4. Evolve the inventors' stakeholder understanding

Figure 2: Method of interest

With more knowledge, the inventors updated their business case and continued developing their invention. Through their iteration process, the inventors prepared their second presentation towards the same stakeholder or used their increased knowledge to decide on the next concern the inventors wanted to validate towards another stakeholder.

Results

Within the timespan of the research period, the inventors performed 13 presentations. The researchers have evaluated their own performance, presented in Table 2.

Table 2: Overview on the inventors' own evaluation; in the questions column, 1 is very poor, 5 is very good

No.	Company	Stakeholder role	Type of presentation	Questions				
				Overall	Reasoning	Target	Depth	Realization
1	Sub-supplier	Regional Sales Manager	Technical	5	4	4	4	2
2	Sub-supplier	Senior Engineer Regional Sales Manager Special Environment Specialist	Technical	4	4	4	4	2
3	Sub-supplier	Technical sales	Technical	4	4	3	3	4
4	Sub-supplier	Technical	Technical	4	4	5	4	5
5	Incubator	Manager Energy sector	Technical / Business	4	4	3	4	3
6	Incubator, pot. End. customer	Manager Energy sector Funding Manager Development manager	Application / Business	2	4	2	3	3
7	Potential product partner	General Manager Business/ Sales Manager	Business	5	5	4	5	4
8	Incubator, pot. App. partner	Manager Energy sector Engineering Manager General Manager	Business	5	4	5	5	4
9	Incubator, pot. App. Partner (U)	Manager Energy sector Engineering Manager General Manager Bus. dev. Manager	Business	5	5	5	5	4
10	Incubator (U)	Manager Energy sector Financial	Business	4	5	3	3	3
11	Sub-supplier	Technical Business	Technical	4	5	4	3	3
12	Incubator (U)	Manager Energy sector Financial	Business	4	5	4	4	3
13	Sub-supplier	Technical manager Engineer	Technical	5	5	5	5	5

The questions were:

Overall: How well would rate your ability to communicate and reason about your invention/system?

Reasoning: How did you present the logical line of reasoning throughout the presentation?

Target: How well did the presentation target your stakeholders' concerns?

Depth: How well were you able to elaborate on the stakeholders' concerns?

Realization: In your opinion, had you found a solution worth realizing?

Comment to the conducted presentations. In the two first presentations, the inventors rated their realization low. The reason being that the inventors did present a solution the stakeholder doubted the feasibility. Nevertheless, the inventors had the impression the presentation was good.

In presentation number six, the inventors missed on targeting the stakeholders appropriately by not understanding the stakeholders' role upfront of the presentation. Thereby, the inventors found that they missed on targeting the stakeholders correct subject matter. As consequence, they did not touch correct in-depth information and missed on presenting a good realization.

The inventors had three presentations not planned up-front, marked with a "U". The researchers performed unplanned presentations in meeting settings that had a participant unfamiliar with the business case and invention. In these cases, the inventors had to present an on-the fly, condensed version suitable for said stakeholder.

Post presentation stakeholder survey. The researchers invited stakeholders to participate in a post presentation survey. Soon after the inventors had performed a presentation, they sent the survey to stakeholders that were present for the presentation. It proved to be difficult to receive feedback on the survey. The authors received feedback from only five of the stakeholders.

Table 3: Feedback from stakeholders' survey; 1 is very poor, 5 is very good.

Company	Stakeholder role	Pre. No.	Type of presentation	Questions				
				Overall	Reason ing	Target	Depth	Realiza tion
Sub-supplier	Regional Sales Manager	2	Technical	5	4	3	4	2
Sub-supplier	Special Environment Specialist	2	Technical	4	4	3	3	2
Incubator	Manager Energy Sector	5	Business	4	4	3	3	4
Pot. Product Partner	General Manager	7	Business	5	4	5	4	4
Pot. App. partner	Engineering Manager	8	Business	3	3	5	3	5

The questions were:

Overall: How well did you like the presentation when it comes to communicating and understanding essential aspects of the new system/innovation and its context?

Reasoning: How did you conceive the logical line of reasoning throughout the presentation?

Target: How well did the presentation target your main concerns?

Depth: The concerns covered by the presentation, did you find them comprehensively covered?

Realization: In your opinion, did you find our proposed solution relevant for our identified opportunity?

Observations and findings

How did the T-shaped presentation model contribute to inventors' learning capabilities? The researchers observed that inventors needed to spend time investigating and researching stakeholders so that they may target the stakeholders appropriately. After securing a better understanding of the stakeholders, the inventors made an assumption on how to target the various stakeholders appropriately. Then, while working on generating a targeted T-shaped presentation, the researchers observed that the inventors used an iteration process for generating presentations. During this work, the inventors had an open dialog with discussions throughout the process of generating views, models, and slides. It is the researchers' observations that these discussions unveiled knowledge gaps towards requirements within specific disciplines. Furthermore, it is the researchers' observation that when the inventors were discussing logical holes in their presentations that they unveiled missing disciplines.

It appeared that the startup had an advantage by being two inventors. This made them able to take turns positioning themselves as stakeholders during discussions in the iteration process. The result was that the inventors not only updated models and slides multiple times; it also generated a considerable number of slides. Another observation was that when taking turns looking at the presentation and content as a stakeholder, the inventors also developed strategies of how to target stakeholders correctly.

When the inventors presented towards stakeholders, they, having been working meticulously on generating a targeted presentation, became better suited to link verbal feedback as well as impressions and observations to their work method. For instance, input from impressions and observations as well as verbal feedback changed the inventors' practical rules for how they selected content for presentations targeting their stakeholders. An example is that during a presentation towards a sub-supplier, the inventors became aware that their solution to a technical concern could also be beneficial to the sub-supplier. The sub-supplier had a few years earlier stopped a development program due to lack of a solution to a similar concern. After this episode, the inventors became more conscious of sharing information on a "need to know basis".

At the start, the researchers experienced that, in line with the interviewees' experiences, the inventors spent their time on technical criticalities, solely focusing on their invention. However,

during the period of research, the inventors focus moved towards spending most of their time focusing on critical business aspects. It is the researchers' impression that when the inventors learned more about their stakeholders and their stakeholders' disciplines, they became more aware of what knowledge they needed and what expertise they did not possess. Furthermore, the inventors became more humble and aware of their lack of knowledge, and importantly, gained an increased understanding of where to find expertise the inventors did not possess during the time of research. During the research period, the inventors improved on and appeared less insecure when performing presentation towards new disciplines. One factor may be that the more presentations they performed, they got more familiar and at ease with the situation. Another aspect might be that when being more aware of their expertise and which disciplines they did not master, might have contributed to that they felt less insecure when presenting towards stakeholder outside their disciplines.

It is important to state that if the inventors did not approach entrepreneurship with a learning mindset, it is hard to see that the T-shaped presentation model would have resulted in the same observations.

How did the T-shaped presentation model contribute to the inventors' stakeholders' management? While the inventors spent time researching their stakeholders, it became clear that they got a better and essential understanding of their stakeholders. This contributed to the inventors not only focusing on the stakeholders' organizational role, but also considering their company, business relations, previous experiences, expectations, and interests. This process also contributed to the inventors becoming more aware of their stakeholders' needs but also their stakeholders' influence, making the inventors able to ensure that those stakeholders with high influence are taken care of accordingly. For instance, the inventors updated some business and technical stakeholders regularly, while they informed others on a need to know basis.

The researchers observed that when the inventors performed a T-shaped presentation that did not target their stakeholders appropriately, they became vulnerable as it became clear that the inventors did not have sufficient knowledge about the stakeholders' field of expertise. The researchers discovered that this contributed to weak business relations. However, the researchers also noticed that when performing imperfect T-shaped presentation to sub-suppliers, the business relationship was not that effected.

It is also the researchers' impression that when the Incubator manager observed that the inventors evolved their presentations the business relation strengthened.

How did the T-shaped presentation model contribute to the inventors' realization aspect? The inventors found it most difficult to work on the realization aspect when targeting business stakeholders. When generating the first business presentation, the inventors spent much time discussing how to target the business stakeholders correctly. When the inventors had reached a mutual understanding on how to target the stakeholder appropriately, they spent little time generating the first half, descending into the T-shape compared with the second half of the presentation, ascending the T-shape. In a detailed point of view, the last part of the presentations had large holes as it only held a vague description of how to realize the business case and invention. The researchers argue that the first part of a T-shaped presentation targeting management is close to how a technical inventor thinks when he comes up with an invention. The second half of a T-shaped presentation targeting management relates the invention to the business aspect. Therefore, the first presentation targeting business stakeholders was also the first time the inventors started considering the business discipline. Thus, the first business presentations the inventors performed did not target the stakeholders appropriately. It is evident to the researcher that the inventors did not have sufficient knowledge about the business aspect related to subjects covered by the second half of the T-shaped business presentation. Another factor is that the realization aspect is the last aspect inventors usually focus on, as it can be hard for inventors to focus on the realization aspect without a suitably detailed solution.

The experience from the presentation not targeting business stakeholders in accordance with their specific interest was a rough but valuable experience. Before the next presentation targeting a

business stakeholder, the inventors had spent much time researching subjects related to the second half of the presentation. The time spent ensured that the inventors increased their knowledge and in-depth understanding of the realization aspect of their business case and how it related to the technical invention.

How did the T-shaped presentation model contribute to correct in-depth subjects when targeting stakeholders? The researchers saw Muller's outline on how to use the T-shaped presentation model as good guidance on the in-depth subject presentations needed when targeting stakeholders. However, based on the inventors' experience on using the T-shaped presentations towards external stakeholders, the inventors found it hard to balance the "need to know basis" versus not sharing enough information and potentially lose their stakeholder's interest, or worse, lose the opportunity for valuable feedback

An example is a series of presentations the inventors performed towards a potential application partner. During the first presentation, the inventors did not show more in-depth information than a black box of their invention. Nevertheless, the stakeholder became sufficiently interested, and it became natural to have a second meeting. The verbal feedback from the inventors' incubator was that it could be beneficial to share more in-depth information during the next presentation. Thus, it seems crucial to present enough information towards business stakeholders to catch their interest, but not so much that inventors share valuable information that they should keep confidential. This seems to be a learning that inventors must experience themselves towards their own stakeholder network. An interesting observation was that nearly all stakeholders participating in a presentation wanted more in-depth information. This observation might explain some of the time constraint issues inventors face. It shows a time paradox: inventors need to spend time generating knowledge, slides, and models to present a proper in-depth T-shaped presentation with the risk of having spent much time focusing on an incorrect solution. It can thus be valuable for inventors, in some settings, not to have sound and detailed information, thereby enabling stakeholders to help narrowing the solution gap.

How did the T-shaped presentation model contribute with appropriate subject matters when targeting stakeholders? As for contributing to correct in-depth information, Muller's outline was also valuable for the inventors putting up appropriate subjects matters. A well-prepared T-shaped presentation brings the stakeholder on a journey from identified problem to solution and further: how to realize the solution? It becomes easy for stakeholders to find holes. These holes can be knowledge gaps or concerns the inventors have not yet identified. However, these holes represent the T-shaped presentation model's feature as inventors can use these holes to their advantage when seeking more information. Nevertheless, inventors should use known holes carefully, since Grégoire, de Koning, and Oviatt (2008) found that during stakeholder interactions, not all arguments are equally important. The researchers observed that presenting T-shaped presentations with holes towards technical stakeholders could be an excellent tool to receive valuable technical information. The researchers do, however, advice to employ care when using logical holes as a feature towards business stakeholders. Technical stakeholders and business stakeholders as a rule of thumb have diverse types of personalities and thus do not need identical treatment. For instance, if the inventor leaves out information, the business stakeholder might get a negative impression on the inventor.

The feedback from nearly all stakeholders that they wanted more information, shows the time pressure on the inventors. This also contributes to the research findings; that gaining knowledge is vital to inventors. In a domain where everything appears to be urgent and important, the environment relates to VUCA. Working under such circumstances can present difficulties with regards to presenting information in a logical manner. Inventors should seek to receive feedback and validation for as many issues as possible, as this will push the inventor multiple steps forward. The researchers observed that the inventors became more structured in targeting concerns, during the time of research. The researchers argue that the T-shaped presentation model contributed to enabling the inventors to navigate uncertainty and ambiguity towards defined concerns.

Furthermore, due to work on generating multiple T-shaped presentations, the inventors achieved a mutual understanding of their FEI challenges.

As feedback from the stakeholders' survey presents, it seems like the inventors reasoning was acceptable. One can argue that the reason for not achieving top score was the inventors' presentation skills or the way they chose words during their reasoning.

Not all the inventors' presentations had a perfect shape of a "T". Meeting objective and the inventors' knowledge influenced the shape of the "T". An example is a presentation the inventors performed toward a potential product partner. The main goal of the meeting was to explore potential synergies of the two business models. The inventors knew that the stakeholders were well aware of the market potential. Therefore, the inventors performed a presentation that ended halfway when reasoning about the second half of the "T". Ending the presentation halfway through the reasoning started a targeted and valuable discussion. This can be the reason for the good feedback on our stakeholder survey. It may also explain the inventors scored high on their own survey.

How did the T-shaped presentation model influence the inventors' reasoning when targeting stakeholders? The researchers observed that the inventors' reasoning abilities increased during the time period of performing research. One advantage the inventors had was that due to them being a team during the work of generating a targeted presentation, it became a training setting where the inventors became drilled in reasoning due to debating on models and slides, slide objectives, and the order in which slides should be presented. Another observation by the researchers is that as the inventors' knowledge of their stakeholders, their technical invention, and business case increased, so did also their reasoning abilities. This proved to be valuable for the inventors when performing unplanned presentations.

How did the T-shaped presentation model add overall value to presentations targeting stakeholders? An overall value the T-shaped presentation adds is that it is a model and not a template. It invites inventors to adapt the model to their domain based on the inventors' impressions and observations. Thereby being a guiding platform that inventors can use building experience and guiding them into learning how inventors target their stakeholder appropriately when conducting presentations.

Another overall value is that when presentations are built on the T-shaped presentation model to target business stakeholders, it provides the business stakeholders with the information they need for validating the business case - "go/no-go" decision on a business level. Towards technical stakeholders, the researchers observed that it provides the information the stakeholders need to validate the technical invention

During generating a T-shaped presentation, the inventors generated a lot of extra slides that they ended up with not using in the presentation. However, the researchers observed that these slides could become valuable during discussion or questions during the presentation.

Recommendations on how to use the T-shaped presentation model

The researchers have the following guidance for inventors using the T-shaped presentation model, see 4. The table is containing questions that inventors should ask themselves so that they get a better understanding of the stakeholder.

Table 4: Guidance to inventors using the T-shaped presentation model

No.	Stakeholder investigation	Pre. No.	T-shaped Presentation impact
1	Organization	What organization do the stakeholders represent? Vision & Mission statement? Any known business relations or assignments that unveil organizational objectives that can be used to inventors' advantage?	Evaluate so that the inventor does not share his business secrets. Impact presentation depth and content
2	Role	Which role do the stakeholders represent? What is their authority and responsibility?	Use the insight to identify appropriate presentation depth. It does also influence the type of information and might influence the

			order in which information is presented.
3	Experiences	What experience/preferences (Technical, methodology, business) do the stakeholders have?	Relates to selected subject matter during the presentation.
4	Expectations	What are the stakeholders' expectations towards: (What subject do they expect to see during the presentation) Risk, solution, technology? business risk, sales number, business opportunities, etc..	Relates to presentation subjects and in-depth s and solution
5	Influence	How much impact to the stakeholder have? Are the stakeholders related to a major concern?	Increased impact has influence in T-shaped presentation quality

The researcher will advise inventors testing the presentation generated by following the T-shaped presentation tool in safe environments prior of conducting a presentation to business stakeholders.

Conclusion

We have elaborated on our research questions to find out how the T-shaped presentation model adds value to presentations targeting stakeholders.

The T-shaped presentation model is a valuable starting point for inventors when generating presentations targeting stakeholders. However, the T-shaped presentation model in its original form does only provide guidance into use towards business stakeholders. As inventors learn about their stakeholders, business case, technical invention, and adapt the T-shaped presentation model, it becomes a powerful tool for inventors generating and presenting presentations towards the variety of stakeholder.

The two inventors that applied their master project research on the stakeholder communication of their start-up company experienced significant learning benefits from the necessity to substantiate the effects of the T-shaped presentation. The fact that they had to step out of the daily hectic into the more abstract research world forced them to gather feedback and to evaluate their impact on the stakeholders.

Future research. The value of T-shaped presentations needs more research to equating inventor performance exclusively with startup performance. Similar to this research, one major challenge could be the data collection, especially in the early-stage formulation of start-ups. However, the industry-as-laboratory model may have similar benefits for other practitioners. We propose to research the impact of using this model on the performance of practitioners.

Acknowledgement

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