21st Nordic Conference on Small Business Research
Conference Proceedings

Editors:

Kim Klyver , Suphitcha Ek-uru, Josephine Gaza, Simon Jebsen, Steffen Korsgaard, Daniela Maresch, Suna Løwe Nielsen, Mette Søgaard Nielsen, Emma Perriton, Jesper Raalskov, Martin Senderovitz, Marianne Storgaard & Kent Adsbøll Wickstrøm

University of Southern Denmark

Department of Entrepreneurship and Relationship Management, Kolding

18th-20th May 2022

FOREWORD

The 21st Nordic Conference on Small Business (& Entrepreneurship) took place at University of Southern Denmark in Kolding May (18)19-20, 2022. In total, 110 scholars participated of which 18 PhD-students also participated in the doctoral consortium. Apart from the doctoral consortium, the conference featured 81 paper sessions with 3 papers in most of them. The sessions included special theme tracks, general tracks, and paper development tracks. Special theme tracks focused on research themes that are central in Nordic research on small business and entrepreneurship (i.e. rural entrepreneurship; design, entrepreneurship & SMEs; Embeddedness and entrepreneurship; Public-Private innovation; Women's entrepreneurship; Sustainability in entrepreneurship and SMEs).

Keynote speeches started each of the two conference days:

"Human design, creativity and entrepreneurship in the digital future"
By Professor wsr Jakob Sherson, Aarhus University

"The entrepreneurial university"
Paul Steffens, University of Adelaide

Six awards were provided: three awards to doctoral students, one best qualitative paper, one best quantitative paper, and one "Nordic spirit" paper. Socially, the conference featured city and campus tours, welcome reception, and conference dinner with 3 dishes, DJ, and dance at Kolding Hus. Myselfie - from a Danish startup - documented the participants' happiness and the conference informal atmosphere.

Thanks to

Track chairs, keynote speakers, scientific committee, senior scholars at Doctoral consortium (chair Kent Adsbøll Wickstrøm, Hans Landström, Ulla Hytti, Paul Steffens, Mette Søgaard Nielsen, and Kim Klyver), the tour guides (Martin Senderovitz and Suna Løwe Nielsen), awards committee (chair Mette Søgaard Nielsen, Josephine Gaza, Marianne Storgaard), and of cause all the participants.

Also, thanks to our sponsors

CARLSBERG FOUNDATION

And a special thanks goes to Pernille Christensen who with excellence made sure everything was working smoothly from submission, registration, catering, welcome reception, conference dinner, and tons of other stuff including unforeseen issues.
Thanks a lot, Pernille!

History of NCSB

Since its inception in 1980 the NCSB conference has been a biannual event in the Nordic tradition characterized by an open atmosphere that encourages the exchange of ideas between researchers with research interests in the field of small business and entrepreneurship.

The NCSB conference in Turku 2024 continues the tradition. See you all in Turku in 2024.

Thank you everyone for making the three days inspiring and fun.

Kind regards,

Kim Klyver, University of Southern Denmark

On behalf of the local organizing group.

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The Department of Entrepreneurship and Relationship Management

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TABLE OF CONTENTS

CONFERENCE PROGRAM

Wednesday, May 18
Full day – Doctoral consortium (Room 61.01)
City- and campus tour – with Suna Løwe Nielsen & Martin Senderovitz 15.30-17.00 Meet at the main entrance (no signup)
Registration (Atriet) 16.00-19.00
Welcome receptions – drinks and small snacks (Atriet) 17.00-19.00

Thursday, May 19						
Registration (Atriet) 8.00-8.30						
Welcome: Kim Klyver (Room 11.57) 8.30-9.00						
Keynote: Jacob Friis Sherton (Room 11.57) 9.00-9.45						
Break 9.45-10.00						
	Room 31.09	Room 31.39	Room 31.40	Room 31.41	Room 31.42	Room 31.43
Session 1: 10.00-11.30	Education Track "Opening session" by track chairs "Financial Curricula and the Hidden Causes of Financial Crises: Revamping University Teaching of Market Finance" by Isaak, Bouchet & Isaak "Tweaking outcome and content in entrepreneurial learning settings - the case of the 'Scandinavian Growth Creators'-project" by Nielsen, Bilenberg, Nørgaard, l Thomassen & Ramsgaard	Design track "Introduction to track and Journal of Business Venturing Design" by track chairs "Mapping Design-driven Entrepreneurship" by Telalbasic "Design Sprints vs. Design Thinking – a conceptual, comparative analysis" by Ansberg	Embeddedness Track "Embedding and intrapreneuring as dual processes in a hybrid organization – the role of different logics" by Wigren-Kristoferson, Hellerstedt & Thomasson "Work Organization and Entrepreneurship" by Holm, Nielsen & Timmermans "Facebook Sampling, Gamification and the Challenge of Representativeness - – Towards a Methodology for Surveying Hidden Populations" by Fink, Maresch, Akele-Abebe, Gartner, Landström & Breitenecker	Public Private Innovation track "The Emergence of Platforms and Ecosystems for Patient-Centric The Emergence of Platforms and Ecosystems for Patient-Centric Healthcare" by Adarkwah, Olsen, Hoholm & Berranger "Policy on a mission? Policy on a mission? Demand-driven innovation as an enabler of health care co-production" by Torvinen,	Rural Track "Tiny splashes in still waters? Exploring the limited effects of rural entrepreneurship on regional inequalities" by Korsgaard, Gaddefors & Ferguson "Who's in charge? Human and nonhuman agency in entrepreneurship and context" by Melin & Gaddefors	Women track "Entrepreneurship as navigating intersectional challenges in the context of poverty" by Hashim & Roos "Variations in gendered understandings of a 'good investment case' – the role of investors' lived experiences" by Lindvert, Alsos & Breivik-Meyer "How female founders as role models influence nascent female entrepreneurs" by Skov

				Mainela, Alalääkkölä, Hyrkäs & Pikkarainen "Public-private interactions in emerging sectors: a review and research agenda" by Stein da Silva, Evers & Koivumäki		
Lunch: 11.30-12.30 NCSB Committee meeting: 11.45-12.15						
Session 2: 12.30-14.00	Education track "Towards Participatory Entrepreneurship in Research and Education" by Heape, Larsen, Fellegi & Buur "The impact of an international tech entrepreneurship education program on entrepreneurial intention" by Valek, Sansone, Andera & Paolucci "How sustainable are future entrepreneurs? The tension between economic benefits and societal and environmental value creation" by Senderovitz & Jepsen	Design Track "Adapting Design Sprints to a diverse SME context" by Ansberg "What's sociology got to do with it? An interdisciplinary outlook on knowledge-intensive innovative entrepreneurship in creative industries" by Gustafsson & Strandvad "Co-evolvement of start-up maturation and design thinking in a longitudinal study of healthcare innovation" by Søndergaard & Biskjær	Embeddedness track " University startup accelerators as identity work spaces" by Frederiksen & Thrane "Creative-artistic entrepreneurship in non-urban places explained through a resource-exchange and network embeddedness logic" by Leick; Gretzinger & Roddvik "Wrapping up" by track chairs	Public Private Innovation track " Buying the unknown: The fuzzy front end of public procurement of innovations" by Abrahamsen, Clarke & Evald "Triggering innovation through interfaces: Leveraging resources between small firms and public organizations" by Evald, Ulkuniemi, Mainela & Clarke "0n the regional and relational nature of public procurement: On the regional and relational nature of public procurement:	Rural track "The force of Social Media – Consequences for Rural Entrepreneurs" by Jonsson "Bibliometric Analysis of Rural Entrepreneurship: A Sustainable Oriented Research Path" by Gonzalez-Masip & Marcos "The dynamics of rural entrepreneurial ecosystems - Energizing potential growth in nature based micro-firms potential growth in nature based micro-firms" by Grande, Carlsson, Sörensson & Dalborg	Women track "Challenging the Analytical Toolkit of Women's Entrepreneurship: A Modification of the '5M' Framework" by Schaper "Wrapping up" by track chair

				Discursively producing a place-embedded public-private partnership" by Laari-Salmela, Mainela & Ulkuniemi		
Break: 14.00-14.15						
Session 3: 14.15-15.45	Education track "Narrating casework in entrepreneurship education" by Ramsgaard "Entrepreneurship Competency Development: In Search of Common Ground" by Schenkel, D'Souza, Hornsby & White "Teaching Entrepreneurship as Design" by Berglund	Paper Development Track (Astrid Heidemann Lassen) " Heroes versus helpful wives: Representations of women entrepreneurs in poverty context" by Ginting-Carlström "The reproduction of stereotypes through theory – the discourse of effectuation" by Meyer "Typology of well-being in ecosystems: Capturing the heterogenous strengths of dissimilar ecosystems" by Stroila, Steffens, Plewa	General: Uni-entrepreneurship (Chair Maresch) "Researchers stuck in the middle: Surrogate entrepreneurs in academic spinoffs – A needed but unwanted addition?" by Nikiforou, Alkærsig, Voudouris & Broeng "Enacting Positive Social Change through Business School Teaching: The Challenge of Sustaining Social Innovation" by Coletti, Fink & Maresch	Public Private Innovation Track "Innovating Together for Change: Bringing the SDGs into Public-Private Innovation Partnerships" by Perriton, Ingstrup, Evald & Korsgaard	Rural track "Robust businesses in time of crisis - The role of resources and capabilities" by Grande, Dalborg, Friedrichs, Håpnes, Sabel & Løvsletten Troset "Wrapping up" by track chairs	
Break: 15.45-16.00						
Session 4 16.00-17.00	Education track "Playing Entrepreneurship and Role models - Developmental Evaluation on Experiential Entrepreneurship Education in the Primary School 6th Grade together with HEI" by Gustafsson-Pesonen					
Conference dinner 18.00-23.00 – Koldinghus, Koldinghus 1, 6000 Kolding 10 minutes' walk from the university						

Friday, May 20						
Keynote: Paul Steffens (Room 11.57) 8.45-9.30						
Group Photo (Stairs outside Room 11.57) 9:30-9:45						
Break 9.45-10.00						
	Room 31.09	Room 31.39	Room 31.40	Room 31.41	Room 31.42	Room 31.43
Session 5: 10.00-11.30 (3)	General: Finance & Acquisition (Chair: Isaak) " Mark my Words: Perceived Agreeableness, Trust and Equity Crowdfunding of Technology Ventures" by Isaak, Neuhaus & Bostandzic "Venture Governance: Startups Acquiring other Startups" by Gan & Erikson "What financial risks do SMEs and service providers face in the service offering? Multiple Case Study of Finnish Process Industry Companies" by Naeem & Ghani	General: Support (Chair: Nielsen) " Entrepreneurial Advice on Social Media as a New Form of Mentoring" by Gaza, Brennecke & Elfring "Linking incongruent perceptions of organizational support for corporate entrepreneurship to the identification of new business ideas in SME" by Kollmann, Stöckmann, Linstaedt & Ortner "Networking orientation turning social support into progress – a dynamic model" Nielsen, Klyver & Stenholm	General: SMEs (Chair: Rasmussen) "Developing dynamic capabilities for business model innovation in family firms: The role of transformational leadership" by Correggi & Di Toma "From dying SME to re-born global gazelle" by Petersen "Digital transformation of the SMEs" by Servais & Rasmussen	General: Entrepreneur (Chair: Steffens) "Artistic Darwinians: An Entrepreneurial identity in the creative economy " by Hytti "Celebrity founders and reputation building in new ventures" by Sheri, Achtenhagen & Naldi "Developing and Validating a New Scale for Entrepreneurial Opportunity Attitude" by Alemayehu, Steffens & Gordon	General: Behaviour (Chair: Schenkel) "Between self and circumstances: The role of stability in entrepreneurial perseverance" by Jiang & van Burg "The role of entrepreneurial bricolage in students as a source of entrepreneurial action" by Manzi "Organizing Chaos with Innovative Intent: Examining the Duality of Closure and Creative Self-efficacy through Business Model Novelty" by Schenkel, McDowell & Brazeal	Sustainability track "Entrepreneur ship as a driver for advancing the United Nations Sustainable Development Goals: A study in Fiji" by Clausen, Vang & Dana "Getting the Windmills to Turn: Entrepreneurship and Sustainable Food Markets" by Astner "How institutional context effects sustainability practices? An analysis of Certified Benefit Corporation SMEs" by Boffa & Prencipe
Lunch: 11.30 12.30						
Session 6: 12.30-14.00 (3)	General: Eco-system (Chair: Korsgaard) "Entrepreneurial ecosystem well-being: A multi-dimensional, multi-level configurational	General: Family (Chair: Wickstrøm) "Family business successions between desire and reality" by Pahnke, Schlepphorst, Schlömer-Laufen	General: SMV/New venture (Chair: Senderovitz) "Creation of organizational routines in new ventures" by Sheri	General: Entrepreneur (Chair: Stenholm) " Income inadequacy among creative professionals – An interplay of identity and	General: Crisis (Chair: Klyver) "Government Aid, Financial Soundness and Going Digital: The Case of Armenian SMEs during COVID-19" by	Sustainability track "Tensions in the Triple Bottom Line and the Sustainability Development Goals: A Challenge for Sustainable Entrepreneurship?" by Jebsen,

	conceptualization of ecosystem health" by Stroila, Steffens & Plewa "How entrepreneurial are Airbnb hosts in rural regions? An exploratory profiling study from three Nordic regions" by Mitchell, Borowiecki, Vinogradov, Leick, Gunnarsdóttir, Zhang, Gretzinger, Vilhjálmsdóttir "The impact of public support for innovation on output additionality" by Prencipe & Boffa	"How ambidexterity and governance interact for business model innovation in family firms" by Di Toma & Correggi "Family firm internationalization - effect of family business legitimacy" by Wickstrøm	"Show of Strength: Extraverted CEOs and IPO Success in Established and Emerging Growth Companies" by Neuhaus, Bostandzic & Weiß "Technology Forecasting and Small Business Strategy: Resource Orchestration in Organizational Settings and Entrepreneurial Ventures" by Lobo & Isaak	skills" by Stenholm, Pukkinen & Heinonen "Lifestyle entrepreneurs on Gran Canaria - Their motives, use of resources, and adjustment to national culture" by Bogren "Repositioning creative freelancers as entrepreneurial agents" by Hytti, Heinonen, Hytönen & Nieminen	Beglaryan, Drampyan & Sargsyan "Same kind of different: A resource dependence perspective of crowdfunding as an external enabler of social enterprises' autonomy, legitimacy, and performance" by Farhoud & Stenholm "SMEs' crisis strategies over time during Covid-19" by Nielsen & Klyver	Senderovitz, Glosenberg & D'Mello "Wrapping up" by track chairs
Break: 14.00-14.15						
Farewell drinks: 14.00-14.30 (Atriet)						

AWARDS NCSB 2022

Best Qualitative Paper Award

awarded to

Hina Hashim and Annie Roos

for the paper

Entrepreneurs as Navigating Intersectional Challenges in the Context of Poverty

Best Quantitative Paper Award

awarded to

Mark T. Schenkel, Rodney R. D'Souza, Jeffrey Hornsby and Brian Anderson

for the paper

Entrepreneurship Competency Development: In Search of Common Ground

The Nordic Spirit Award

awarded to

Helle Alsted Søndergaard & Michael Mose Biskjær

for the paper

Co-evolvement of Start-up Maturation and Design Thinking in a Longitudinal Study of Healthcare Innovation

Carlsberg Foundation Doctoral Consortium Award

awarded to

Rachel Le Marois

for the PhD project

Working Path of Entrepreneurs Who Have an Invisible Difference

Carlsberg Foundation Doctoral Consortium Award

awarded to

Laurine Keller

for the PhD project

I Am Different Than You Think: Entry Barriers for Neurodiverse Individuals in Innovation Teams

Carslberg Foundation Doctoral Consortium Award

awarded to

Shelter Selorm Teyi

for the PhD project

The Entrepreneurial Pre-Entry Process: Evidence from the Informal Economy

The impact of an international tech entrepreneurship education program on entrepreneurial intention

Lukáš Válek[1], Giuliano Sansone[1], Michal Andera[1], Emilio Paolucci[2]

[1] Prague University of Economics and Business

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ABSTRACT

Even if several studies analysed the impact of entrepreneurship education, just a very few studies analysed the impact of international entrepreneurship education program on entrepreneurial intention. However, due to the diffusion of entrepreneurship education around the world, the higher demand from students for entrepreneurship courses, and the increase of digital and international universities, it is relevant to fill this literature gap. In order to do so, we analysed one of the most promising international tech entrepreneurship education programs named European Innovation Academy (EIA). The data derived from a survey to the participation at the EIA in Turin. In total, out of all 460 participant, 124 participants answered our survey. Based on probit and logit regression analyses, the findings show that the more effort participants put into this program more their entrepreneurial intention increases.

Keywords: Entrepreneurship education; Entrepreneurship program; Experiential learning; Entrepreneurship intention; Student Entrepreneurship

INTRODUCTION

European union is promoting entrepreneurial activity, because it is important source of innovation, creates economic value, jobs and can help lower unemployment (Bacigalupo et al., 2016). One way to support entrepreneurial activity is through entrepreneurship support programs (Bae et al., 2014; Campos et al., 2017). For instance, several studies (e.g., Peterman and Kennedy 2003; Souitaris et al. 2007; Athayde 2009; Martin et al. 2013; Sánchez 2013; Walter et al. 2013; Zhang et al. 2014; Gielnik et al. 2015; Fayolle and Gailly, 2015; Maresch et al., 2016; Chang et al., 2021) showed that entrepreneurship education has a positive impact on entrepreneurial skills and intentions. However, to our best knowledge, none studied the impact of international tech entrepreneurship education programs on entrepreneurial intention. Nevertheless, these international programs bring young people to one location and condensed form, providing them with knowledge and skills relating to new venture creation.

Moreover, what is evident from praxis is that the best performing startups are global, and the European Commission supports international startup teams' creation. In fact, there is a growing interest in born European companies that transcends borders right from the start with multi-national teams (O'Flaherty et al., 2020). Therefore, the critical question is: Do international entrepreneurship programs have the expected impact? This research looks on empirical data from participants of the European Innovation Academy. It is among the top tech entrepreneurship education programs globally[1]. The research analysed the factors that influence entrepreneurial intention (EI).

The purpose of this paper is to understand the impact of international tech entrepreneurship programs on the entrepreneurial intentions of participants. We also explored the role of the effort of participants on EI as it is an un-researched topic. We expect that the effort participants put into the program can influence the impact it will have. This paper also contributes to the understanding of entrepreneurial education in international programs. The growing popularity of entrepreneurship and the success of international teams will probably drive the ever-increasing importance of such programs.

[1] https://www.ft.com/content/6d68a236-e153-11e8-8e70-5e22a430c1ad

BACKGROUND

A multitude of stakeholders, from governments to private organisations, participate in the effort to support new venture creation (Bergamann et al., 2016). The impact of entrepreneurship education is harder to measure because of its complexity. There are multiple layers of impact – individual, organisational and societal. The research focus is mainly on individual students when it comes to education. It can be skills, knowledge and attitudes. For policymakers and society, the main impact is the new entrepreneurial activity and, more importantly, the success of new companies. The main issue with this approach is the longitudinal aspect of the impact. Students might start during their studies, right after graduation, but it can take them much longer. That is why the existing studies use proxies to measure the impact on future entrepreneurial activity. The widely used construct to measure entrepreneurial education impact is in entrepreneurial intentions.

The intention is the antecedent of behaviour (Ajzen, 1988). EI is widely used to assess the future entrepreneurial activity of study participants (Wegner et al., 2019). They are a good proxy for the future venturing activity of the students. The problem with EI is that the results are not consistent across studies (Kassean et al., 2015; Lyons & Zhang, 2018; Wegner et al., 2019). That is why EI needs to be studied among varying conditions and with other factors. We know that extracurricular activities positively impact EI (Sansone et al., 2021). Voluntary international programs might work in a similar way. This is aligned with the effort of European Commission and its initiative of born-europe companies (O'Flaherty et al., 2020).

The role of effort in the change of entrepreneurial intentions is not clear. We used the unique opportunity of a prestigious international program to research the role of effort in international entrepreneurship educational intervention outcomes. Building a new venture takes years and requires substantial time investment (Reynolds & Curtin, 2008). We know from previous research that effort impacts work outcomes (Latham & Pinder, 2005). We explored if this works similarly on the impact of the entrepreneurship program.

METHODOLOGY

Our survey's questions and possible answers were taken from the entrepreneurship literature, such as GUESSS project[2]. Table 1 summarises the variables from the survey that we applied for the regression analyses.

Outcome variable (dependent variable)	
NAME	**DESCRIPTION**
EI_i	dummy variable = 1 if the student *i* declared that he/she has the intention to create his/her own company; = 0 otherwise.
Predictor variable (independent variables)	
NAME	**DESCRIPTION**
$Engagement_i$	a number of hours per day, on average, that the student *i* worked on developing your idea at the European Innovation Academy in addition to the lecture in the morning.
Control variables (independent variables)	
NAME	**DESCRIPTION**
$Male_i$	dummy variable = 1 if the student *i* is a man; 0 otherwise.
Age_i	age of the student *i*.
$LevelEdu_i$	dummy variable = 1 if the student *i* has a bachelor degree; 0 otherwise.
$BusinessEducation_i$	dummy variable = 1 if the field of study of the student *i* is Business (including Marketing, Finance, Management, and Economics); 0 otherwise.
$Work_i$	dummy variable = 1 if the student *i* has had previous work experience; 0 otherwise.
$EntrepreneurialUniversity_i$	categorical variable regarding the declaration of the student *i* on the favorable climate for becoming an entrepreneur at his/her university. The categorical variable goes from = 1 (not at all) to = 5 (very much).

[2] https://www.guesssurvey.org/

$ParentsSelfEmployed_i$	dummy variable = 1 if the parents of student *i* are/were self-employed; 0 otherwise.
$LogGDP_i$	GDP of the student *i*'s country of study (logarithm).

The questionnaire was distributed at the end of the European Innovation Academy. Out of 460 participants (population), 124 participants (sample) answered our survey. Therefore, the response rate is equal to 27%. Our analyses show that the sample is statistically representative for the population in terms of nationalities, gender, and age.

With the variables presented, we performed several Probit and Logit regression analyses in order to test the impact of the European Innovation Academy on the entrepreneurial intentions of the participants. We performed Probit and Logit regression analyses since our dependent variables are dummy variables. For instance, similar studies in the literature of entrepreneurship (e.g., Sansone et al., 2021) did the same. All the analyses were performed with the Stata Software with robust standard errors.

RESULTS

First we present Table 2 with some qualitative information about our sample.

	Observation	Mean	Median	SD	MIN	MAX
EI	124	0.30	0	0.46	0	1
Engagement	124	3.96	4	0.95	2	6
Male	124	0.78	1	0.41	0	1
Age	124	23.23	22	3.71	18	36
LevelEdu	124	0.31	0	0.46	0	1
BusinessEducation	124	0.31	0	0.47	0	1
Work	124	0.52	1	0.5	0	1
EntrepreneurialUniversity	124	3.31	3	1.14	1	5
ParentsSelfEmployed	124	0.45	0	0.50	0	1
LogGDP	124	6.30	6.27	0.67	4.36	7.27

Table 2 - Summary statistics of the regression variables

Regarding the dependent variables, as it is possible to see from Table 2, on average, 30% of the respondents have entrepreneurial intention. Regarding the predictor variables, in addition to the

lectures in the morning at EIA, the majority of the students in our sample worked on developing their idea at the EIA for almost 4 hours per day since the mean of the variable Engagement is equal to 3.96 and the median of the variable Engagement is equal to 4. We can also notice that the minimum number of hours per day is equal 2. Therefore, based on the answers received, we can say that everyone worked on developing their idea at the EIA. Based on Table 2, we noted that the majority of the students in our sample are male since the mean of the variable Male is higher than 0.5 and the median of the variable Male equals 1.

Furthermore, the students in our sample are young with an average age of 23 and a median age of 22. In line with this, the majority of the students in our sample is Bachelor students since the mean of the variable LevelEdu is lower than 0.5 and the median of the variable LevelEdu is equal to 0. This means that the majority of the students in our sample does not have a Bachelor's degree. Additionally, 31% of them are studying Business (including Marketing, Finance, Management, and Economics). The other possible fields of study were (in order by a number of answers): Sciences and Technology (e.g. Engineering, Informatics, Mathematics, Physics, Medicine etc.); Arts and Sports; and Design or Architecture.

Interestingly, a little more than the majority of the students in our sample (52%) declared to have work experience. In addition to this, regarding the variable EntrepreneurialUniversity, it is possible to notice that the majority of the students in our sample declared a medium value (3) of the favourable climate for becoming an entrepreneur. For instance, the average equals 3.31 and the median equals 3, and the range was from = 1 (not at all) to = 5 (very much). Moreover, 45% of the students in our sample declared to have at least one parent as self-employed. Finally, we cannot say much regarding the variable LogGDP since it derives from a logarithm, and it is the only variable that does not derive from the questionnaire.

Then, we performed several Probit and Logit regression analyses in order to test the impact of the EIA on the entrepreneurial intentions of the participants. Before running the Probit and Logit regression analyses, we also checked the correlations between the selected variables. The correlation matrix did not present any high statistically significant correlation between the selected

variables. Therefore, we proceed to perform our Probit and Logit regression analyses. The following Table 3 presents just two of the Probit and Logit regression analyses performed.

Table 3: Probit and Logit regression analyses

	Probit		Logit	
	Dependent Variable: EI			
Engagement	**0.59****	**(0.24)**	**0.35****	**(0.14)**
Male	-0.52	(0.50)	-0.30	(0.30)
Age	0.03	(0.08)	0.02	(0.05)
LevelEdu	-0.59	(0.59)	-0.33	(0.34)
BusinessEducation	0.22	(0.46)	0.12	(0.28)
Work	-0.32	(0.51)	-0.18	(0.30)
EntrepreneurialUniversity	0.01	(0.19)	-0.01	(0.11)
ParentsSelfEmployed	-0.37	(0.43)	-0.23	(0.25)
LogGDPMillion	-0.72**	(0.33)	-0.44**	(0.20)
Constant	1.35	(2.72)	0.97	(1.63)
Observations	124		124	
Log likelihood	-69.23422		-69.32092	
Pseudo R2	0.0839		0.0828	

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Furthermore, we performed several robustness checks on our regression models. For instance, we performed seven additional regression models by adding one control variable for each model (Probit and Logit). To give an example, we ran the Probit regression model with the predictor variable and only the control variable Male; then with the control variables Male and Age; then with the control variables Male, Age, and LevelEdu; then with the control variables Male, Age, LevelEdu, and BusinessEducation; then with the control variables Male, Age, LevelEdu, BusinessEducation, and Work; then with the control variables Male, Age, LevelEdu, BusinessEducation, Work, and EntrepreneurialUniversity; then with the control variables Male, Age, LevelEdu, BusinessEducation, Work, EntrepreneurialUniversity, and ParentsSelfEmployed; then with all the control variables as in the previous Table 3.

All our robustness checks as well as all the analyses presented in Tables 3 showed that the more engagement participants put into this program (in terms of hours), the more their entrepreneurial intention increases.

CONCLUSIONS

Our research's core motivation was to confirm the impact of international entrepreneurship education on entrepreneurial intention. There are studies of the influence of entrepreneurship education on the EI (e.g., e.g., Peterman and Kennedy 2003; Souitaris et al. 2007; Athayde 2009; Martin et al. 2013; Sánchez 2013; Walter et al. 2013; Zhang et al. 2014; Gielnik et al. 2015; Fayolle and Gailly, 2015; Maresch et al., 2016; Chang et al., 2021), but to our knowledge, no resources speak about the impact of international entrepreneurship education on EI. The main importance of inclusion of the international element is a wider range of points of view and approaches, cultural contexts, localised and transferable solutions, and it allows the circulation of knowledge in general (Madge et al., 2014; Wolhuter & Wiseman, 2019a); therefore we focused on this niche.

In conclusion, our regression analyses show that the more effort participants put into this program more their entrepreneurial intention increases. Therefore, we can say that if a student puts effort into an international entrepreneurship education program, such as EIA, he/she will increase his/her entrepreneurial intention.

Our study is not without limitations, however. The main limitation is caused by the fact that we did not include a control sample in our study. In other words, we did not consider students who attended an international entrepreneurship education program versus students who did not attend an international entrepreneurship education program. However, we discovered that the more effort students put into the international entrepreneurship education program, the higher their entrepreneurial intentions are. There is also the possibility of reverse causality between our dependent and independent variables. The study participants might have put more effort into the program because their entrepreneurial intention is already high. So pre-survey should be conducted to identify possible initial entrepreneurial intention, which could also boost higher entrepreneurial intention rates afterwards. In other words, there would be probably a difference between students

with very low entrepreneurial intention and those with high entrepreneurial intention as a starting point. It would also be beneficial to conduct a post-study to explore how EI develops further if there is steady growth or if it decreases with possible entrepreneurial failures.

Even if this study presents some limitations, we believe our results offer several theoretical and practical contributions. This paper contributes to the body of literature on EI. For instance, we empirically tested the impact of an international entrepreneurship education program on the entrepreneurial intention of the participants. The international dimension in entrepreneurship education provides a more comprehensive basis. It encompasses even more points of view and could offer a bigger picture to avoid possible recursive problems (Wolhuter & Wiseman, 2019b) and learn from best practices with diminishing spatiality importance (Madge et al., 2014). With the growing interest in bridging the boundaries of entrepreneurship in Europe, we expect an increasing number of international programs.

Moreover, our results may increase the interest in offering international entrepreneurship programs in universities. This can be even more feasible due to the current pandemic of covid-19 and the digital universities' courses such as regular online courses or even MOOCs where there could also be added value of more significant impact on entrepreneurial intention of the broader population, not only regular university students. Finally, our results make the paper relevant for educators, program managers and policy makers. The results of our empirical study indicate that it is important to invite motivated participants that are willing to participate in the program actively. The regression analysis results show that the effort put into the program has a significant impact on participants' entrepreneurial intentions. The implication of the results for praxis relates to the international entrepreneurship programs selection process. Leaders of such programs should focus on passionate and engaged participants who will utilise the most benefits. The question on planned hours for the program can be used as an estimate for the future effort of participants.

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Entrepreneurship as a driver for advancing the United Nations Sustainable Development Goals: A study in Fiji

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As social anthropologist Fredrik Barth explained, entrepreneurship is a driver of social change. This conference paper argues that entrepreneurs can help society attain UN Sustainable Development Goals (SDGs). We investigate entrepreneurial initiatives at the micro-level with a view on macro- and meso level processes of the SDGs.

Our focus is Fiji -- the first country to ratify the Paris Climate Change Agreement in 2016. A new Fiji Water Act had already replaced the Water Supply Act of 1950 and a new Fiji Water Authority established. More recent legal developments have been: (1) the drafting of new legislation to establish the Fiji Water Authority which will supply water to all towns in the country; and (2) draft amendments to the Minerals Act, which (a) establish a requirement to obtain a permit to extract groundwater (and to install bores and wells) within declared areas, and (b) limit polluting activities in declared areas, for the purpose of protecting the quality of groundwater.

It is expected that entrepreneurship shall be combined with other societal actors towards the 17 SDGs for the 2030 proposed by the United Nations in substitution to the Millennium Goals (United Nations, 2015). Yet, influence of the institutional environment and how this might foster or diffuse the efforts of entrepreneurship to advance SDGs has so far received little attention. Furthermore, little is known about what policy directions might be suitable to further SDGs at a local level. Given the ambiguity surrounding entrepreneurship, the lack of clarity about implementation aspects and the paucity of information about how institutional environment might shape entrepreneurs and their efforts to advance sustainability transition and the SDGs there is considerable scope to explore these issues.

Literature on entrepreneurship in the Global South provides novel insights about the diversity of entrepreneurship in which sociocultural reasoning might play a significant role (Dana 2009; Clausen, 2017; Ratten & Dana, 2019) and might inform our understanding of the present challenges with advancing the SDGs. Often entrepreneurs incite behavioural change at a local, regional and societal level through impacting their customers, employees and communities (Clausen, 2017; Loorbach &

Wijsman, 2013; Patzelt & Shephard 2011). However, little is known about how entrepreneurs respond to, localise and advance the SDGs.

The research on SDGs to date has mainly focused at a global, and national scale despite the fact that the 2030 Agenda also includes the relevance of how local actions can contribute to achieving the SDGs (2030 Agenda) and as argued by Smith et al (2018: 1483) "despite the need for global outcomes most implementation (of the SDGs) will be local" and integrating current knowledge on the social change dynamics at multiple scales will be essential to achieve the SDGs (Norström et al., 2014). Literature suggests that entrepreneurs' local knowledge, community-led approaches, networks and peer to peer relationships can play a crucial role as drivers of the sustainability transition that not only translate into economic growth through commodification of local resources but also ensure behavioural change of people. We investigate how entrepreneurs in different local initiatives address and influence their surroundings in progressing the SDGs.

In the context of entrepreneurship, a centrepiece of the academic debate is the question of how sustainability is in the core of the business model (Poturi & Pani, 2020; York Venkataraman, 2010). Often entrepreneurs have the conditions to alter or create norms, property rights, and government legislation to support better sustainability performance, and be important accelerators of sustainability transitions as well as their initiatives might have repercussions in social and economic policies (Morioka et al, 2017; Clausen 2017).

Evidence suggests that some entrepreneurs acknowledge their crucial role in addressing sustainability and their initiatives feed into the sustainability transition; however, doing something positive is another story (Kaesehage & Leyshon, 2019). The need to explore the role of institutional arrangements is underpinned by the idea that entrepreneurship does not exist in a vacuum rather it is significantly influenced by institutional regulations, practices, structures and cultures over which governments have considerable influence. Governments might have less power and resources to address societal challenges, and entrepreneurs are increasingly perceived as part of the transformative social ecologies that have the potential to generate societal progress (Ebrashi, 2013), and it is this broader societal progress beyond individual enterprise that is in the fore of why governments often demonstrate a keen interest in entrepreneurship.

Incorporating a trans-local informed analysis of entrepreneurship exhibits the implications of sustainability initiatives beyond the traditionally defined socioeconomic impacts. Importantly, transformative change in complex social-ecological systems has shown that the local can shape the global through different processes such as providing response to diversity, local contextualization, and social learning (Geels & Schot 2007), and the empirical cases display the importance of viewing these places as being embedded in pre-existing set of local, regional and transnational flows and relations

that link to global spatially distant consumers that need to be accounted for while engaging with them. Canadian entrepreneur David Gilmour founded Fiji Water, to market water from Viti Levu, in the Fiji Islands. He now sells in 60 national markets, and needless to say, a carbon footprint is created by transporting bottles of water from Fiji to destinations around the world. What prompted this? David realised that guests at his hotel in Fiji bought bottled water from for instance Evian despite being in Fiji which is recognised for its clean pure water; "I thought, my God, they've come 10,000 miles to the middle of the most pristine environment and they're drinking water from a heavily industrialized continent" (Forbes, 2013). Gilmour launched Fiji Water in 1996, sourced from the largest island of Fiji in the underground aquifer in the hills of Viti Levu. Fiji has become one of the key suppliers of pure bottled water and in 2018 the global bottled water market had revenues in the range of US215-260 billion US dollars (globenewswire, 2018). This entrepreneurial initiative generated a mushrooming of emerging water-bottling plants in Fiji Islands that bottle groundwater and seek to access the global consumption market. Yet, the hidden social and environmental cost are unknown due to scarce research about the recharge ability of the aquifers (Kumar, 2010), what is known is the process of bottled water and the consumption of bottled water consumption threats seriously the climate.

The Constitution guarantees the right of every Fijan to have access to clean and safe water in adequate quantities, and accessible and adequate sanitation facilities (5-Year Development Plan 2017-2021, Transforming Fiji: Ministry of Economy, Republic of Fiji), and 78 per cent of Fiji's population has access to a treated and reticulated water supply, while in the urban centres 98 per cent of the population has access (NDP, 2017-2021) and despite the large water resources these are not distributed evenly.

There is concern about the several entrepreneurs who have emulated Gilmour and are selling water from Fiji. No doubt that these entrepreneurial activities resonate with the global concerns on climate change and the need for sustainability transition. However, no single policy approach or instrument is likely to work due to the complexity and interdependence of policy issues and in the face of the massive socioeconomic and environmental challenges multiple initiatives are needed to create alternative socioeconomic and political models to strengthen supportive institutional environments for entrepreneurship.

The Fiji case illustrates how entrepreneurs turn the market into a space for political action in which the entrepreneurs act at the micro-political level by reiterating an alternative assemblage of power relations. We need to understand these roles and contributions to identify the processes, enabling assistance, tools and alliances for these entrepreneurs to advance the sustainability transition. This blurred distinction of responsibility for development outcomes aligns exactly with the critiques made recently by, among others, Blowfield and Dolan (2014). Rather than transforming the underlying

structural complexities of poverty, the entrepreneurs often solve limited, specific social problems, which might make an impressive impact and generate growth only for a limited audience.

A trans-local approach brings the experimental, cross-sector initiatives that might challenge current global regimes. Unfortunately, current assessment and decision-making support tools used to establish local sustainability priorities have limited impact. While impactful sustainability arguments call for radical and systemic change, most solutions ultimately fall under the heading of less impactful sustainability. Often they are not radical, only incremental, and certainly pragmatic.

Income inadequacy among creative professionals – An interplay of identity and skills

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Abstract

Financially challenging work of creative professionals is a widely acknowledged concern. Research has explored how working conditions and type of work affects the income, but has not addressed the influence of individual's identity and business skills on income formation. Drawing from observations of 410 creative professionals, we investigate how identities and business skills impact income formation. Our findings show that perceived creative identity increases the chances of income inadequacy, but obtaining business skills decrease such chances. In addition, the findings suggest that perceived entrepreneurial identity accompanied with business skills decreases the likelihood of income inadequacy. Hence, our findings highlight how individuals' identity and business skills influence individuals' income. Therefore, we welcome ways to support the simultaneous development of individuals' identity and business skills to alleviate the tensions between being creative and surviving financially.

Keywords: Creative identity, entrepreneurial identity, business skills, income inadequacy, cultural and creative industries, CCIs

Introduction

Previous studies highlight creative professionals' encounters with low income (Cunningham et al., 2010) and the precarity of their work (Bridgstock et al., 2015). Research has documented inequality in income distribution among entrepreneurs and self-employed in general (Halvarsson et al., 2018; Kautonen et al., 2017; Åstebro et al., 2011), but it also concerns creative professionals who are likely to work as self-employed, oftentimes with unsecure income (Campbell, 2018; Fritsch & Sorgner, 2014). Despite working long hours for little pay or even for free, creative professionals are driven by artistic freedom and autonomy (Conor et al. 2015; Kovesi & Kern, 2018; Wright, 2015) that boost their professional identity. Following this, Carter and Carter (2020) suggested that creative individuals' identity, being creative or entrepreneurial, and the development of their offerings are connected.

However, in addition to identity construction, the reality of low income among creative workers may stem from neglecting the economic realities of value creation over the need for being a creative professional. Becoming known, emphasizing aesthetic aspects and following audience's demand may weigh over economic value when one prioritizes creative outputs and identity (de Monthoux, 2000; Marshall & Forrest, 2011). However, if one neglects the income aspect of her creative work and downplays the necessary business skills, it jeopardizes one's financial survival (Carter & Carter, 2020; Comunian et al., 2011). This far, however, the research on how individuals' identity influences their income formation has remained scarcely explored.

The purpose of our study is to investigate the role of creative individuals' perceived identity, business skills, and their interplay in income formation. We address these among a sample of creative professionals who work in creative and cultural industries (CCIs) (such as audiovisuals, performing arts, design, and media). Because the previous research stresses that creative professionals as well as self-employed often face low or insufficient income (Campbell, 2018; Cunningham et al., 2010; Halvarsson et al., 2018), we focus on investigating the antecedents of income inadequacy among creative professionals. Specifically, we cover two types of perceived identities, creative and entrepreneurial identity, in order to deepen the insights on the identity's role in income formation. This far the relationship between identity and income has been explored (Chang, 2013), but our approach highlights the role of two types of, possibly opposing identities in income generation. In addition, previous research has shown that business skills maybe vital for being self-employed in CCIs but professionals do not necessarily characterize themselves as entrepreneurs (Coulson, 2012; Haynes and

Marshall, 2018). Hence, unfolding the black box of identity and business skills extends the current understanding of income formation among creative professionals.

Our study contributes to the discussion on the role identity (Stryker & Burke, 2000) and the ways in which it guides individuals' choices at work. Previous studies have shown how managing multiple, even conflicting, identities influence the financial wellbeing and sustainability of creative professionals (Hennekam & Bennet, 2016). Our study unfolds the impact of two identities, creative and entrepreneurial, on the professionals' income inadequacy. Theoretically, our findings imply that if identity is defined as individual's property, as something, which an individual has, adopting a certain identity can be both an economic liability and a personal asset simultaneously (Radu-Lefebvre et al., 2021). Previous research has indicated that business skills may be important in building financially sustainable careers in CCIs (Bartleet et al., 2019). Our study illustrates that these skills are not only a direct antecedent of income formation, but they also influence together with individual's entrepreneurial identity on income formation. Therefore, our study argues that educating business skills alongside with developing one's entrepreneurial identity have an important role in securing the sustainability and survival of creative professionals' work.

Theoretical background and hypothesis development

Work provides individuals with an income, and it generates, for those working, different roles and identities through which individuals perceive themselves as nurses, teachers, scientists, or artists (Berkman, 2014), for instance. Work provides identities, meaning in life as well as self-definition (Stryker & Serpe, 1994), but the extent to which this takes place varies considerably. Even in less rewarding jobs individuals may gain dignity over being able to take care of their families and themselves independently (Berkman, 2014), but in some professions individuals may find also the job itself as a source of meaningfulness.

The challenges concerning the work and working conditions in CCIs are acknowledged. Creative professionals often face irregular or part-time work, hybrid professions and multiple jobs (Campbell, 2018; Carey, 2015; Comunian et al., 2011; Throsby & Zednik, 2011), short contracts or short-term projects (Eikhof & Warhurst, 2013). Therefore, unstable income seem to be a stable attribute throughout a creative career regardless of workers' age (Hennekam & Bennett, 2016), and unpaid work can even be an entry to employment in CCIs (Siebert & Wilson, 2013). Accordingly, insecure and temporal employment and varying, even low income shape the work of creative professionals

(Cunningham et al., 2010). Hence, our focus is on the income inadequacy, which we define as not generating enough income to cover the normal living expenses.

Yet, individuals use their work to form and transform how they define themselves in the context of work-based situations and activities (Dutton et al., 2010; Ibarra, 1999). Work identity refers to work-based self-concept that shapes the roles individuals adopt and the ways they perform their work (Walsh & Gordon, 2008). Creative work in CCIs is often characterized by creativity, autonomy, and self-investment (Neff et al., 2005) all of which contribute to what is considered as "good" creative work (Hesmondhalgh & Baker, 2011). For instance, high flexibility is considered as normal mode of work among creative professionals (Bridges, 2018). Among creative professionals, a less stable contract may generate a sense of control over the creative autonomy of one's work (Changwook, 2014). Hence, despite the employment conditions, for a creative professional creative work enables personal autonomy and provides the sense of meaningfulness (Brown et al., 2010).

Still, through their work-related identity, individuals seek to construct positive identities (Gecas, 1982; Turner, 1982). For creative professionals this may mean that while becoming an artist or alike they are willing to accept and adapt to the precarity of their work (Bridgstock et al., 2015) in order to achieve a creative identity. If this is a norm, the work identity of a creative professional requires accepting uncertain occupational settings and low pay. Hence, this kind of acceptance or ethos can become a part of the collective and socially shared source of individual's identity (Cardador & Pratt, 2006). The downside is, however, that the economic realities in a precarious environment are harsh and creative professionals are prone to income inadequacy while constructing their work identity and performing their work. Individuals working in the arts occupations have smaller income than the total workforce has on average (Cunningham et al., 2010). Further, the strong value given to freedom and autonomy of creative work seem to hinder the aspiration to change the working conditions even if it would diminish economic insecurity (Kovesi & Kern, 2018). The above implies that pursuing for creative identity may put creative professionals' income generation at risk. Therefore, we hypothesize that:
H1: Perceived creative identity increases the likelihood of income inadequacy

Recent studies stress that some creative professionals with strong entrepreneurial orientation make acceptable revenue, but this does not hinder them to experience autonomy and creativity (Nemkova et al., 2019). Entrepreneurial identity also concerns creativity, a need for control, strong desire for freedom and autonomy (Espíritu-Olmos & Sastre-Castillo, 2015; Werthes et al., 2017). Entrepreneurial identity can be a property, which generates meaning and self-definition for entrepreneurs (Mathias &

Williams, 2018) in a similar ways as creative identity for creative professionals. Entrepreneurial identity can be an asset or a liability (Radu-Lefebvre et al., 2021). As an asset entrepreneurial identity operates as a psychological resource supporting the entrepreneurial process (Shepherd & Haynie, 2009) whereas as a liability entrepreneurial identity may trigger escalation of commitment (Rouse, 2016), for instance. Here, we focus on entrepreneurial identity as an asset supporting creative professionals' income generation. Kohn and Wewel (2018) found that in comparison to businesses in non-creative sectors, creative entrepreneurs often start businesses on a small scale, on a part-time basis, and with less financial resources. In his study, Albinsson (2018) found that some musicians who could identify themselves as entrepreneurs were able to make their main income from music. Moreover, an entrepreneurial identity may reduce artists' efforts to complement their art income with non-art related jobs (Lindström, 2016). This implies that perceiving oneself as an entrepreneur might alleviate the pain of income inadequacy. Hence, based on the above we hypothesize that:

H2: Perceived entrepreneurial identity decreases the likelihood of income inadequacy

In addition to perceived identities, individuals' skills may affect their income generation. We focus on business skills, which shape individual's ability to perform in different scenarios (Jackson & Chapman, 2012). For instance, entrepreneurial skills needed in new venture creation range from the ability to recognize new business opportunities to abilities needed to cope with uncertainty and being creative (Bacigalupo et al., 2016; Reis et al., 2020). Contextually, creative professionals' employment conditions and work require the above skills to navigate through uncertainty and being creative in producing the creative outputs and finding ways to generate income. Recent research highlights that entrepreneurial skills support creative professionals in building economically and creatively sustainable careers in CCIs (Bartleet et al. 2019; Wyszomirski & Chang, 2017; Scott, 2012). However, we need to reach beyond the skills needed in creating new ventures to generic skills that concern running a business or securing income. Such skills are multifaceted and may include areas like, for example, accounting, financing, marketing and production (Smilor, 1997). Foss and Saebi (2018) highlight that business models are closer to recognizable constellations of activities dedicated to value creation, delivery, and appropriation. Therefore, we consider that skills needed in creating a business model represents such a balanced set of business skills. Creative professionals similarly to organizations operating in CCIs seek to diversify their incomes streams, increase their independency for public funding, or consolidate and effectively manage their resources, build stakeholders' relationships, and increase public awareness among their stakeholders to gain legitimacy (Carlucci, 2018). These influence the ways through which creative professionals might better make sense of who their audience is, what professionals can offer to them, how and with which resources the offerings are created and how this generates income (see

Foss & Saebi, 2018; Ostervalder, 2004; Wirtz et al., 2016). Therefore, we assume that with higher perceived business skills creative professionals will have less difficulty to generate income. Hence, we hypothesize that:

H3: Perceived business skills decrease the likelihood of income inadequacy

Carter and Carter (2020) suggested that creative individuals' identity and the development of their offerings influence each other. However, when using one's work to create identity and generate income, one might face tensions between commercial and non-commercial goals of work. Those with tendency for being creative and having creative identity may pursue issues that will not translate into income, but provide freedom for creative activity and autonomy. For instance, entrepreneurs in CCIs have to manage simultaneously their creative freedom and business performance (Wilson & Stokes, 2005). Haynes and Marshall (2018) illustrate that musicians usually employ business or entrepreneurial skills, such as planning revenue generation, business activities, selling and innovating, but they are not willing to characterize themselves as entrepreneurs. This suggests that if one obtains skills that help her to combine the needs of the audience and the need of herself, one may overcome the challenges concerning the income generation. Previous research shows that although possessing strong entrepreneurial skills, self-employed creative professionals will not necessarily identify themselves as entrepreneurs (Coulson, 2012). Following this logic, artists' identities range from a 'bohemian' to more 'entrepreneurial' identity, but for both the practices and modes of working remain similar (Lindström, 2016). This implies that despite the identity, creative or entrepreneurial, solid business skills may result into a better financial wellbeing. Accordingly, we hypothesize that:

H4a: Perceived business skills decrease the effect of perceived creative identity on the likelihood of income inadequacy

H4b: Perceived business skills increase the effect of perceived entrepreneurial identity on the likelihood of income inadequacy

Methodology

Data and sample

In testing the hypotheses, we employ data comprising 410 Finnish creative professionals who are working in creative sectors (such as audiovisuals, performing arts, design, and media). Data were collected via Internet-aided survey tool during May-June 2021. Due to the lack of publicly available registers, we applied convenience sampling (Etikan et al., 2016), and the sample population covers 2209 creative professionals whose contact information was available on various cultural websites. Hence, our results are not generalizable to the entire population of creative professionals. After three rounds of reminders, we received responses from 456 creative professionals, which generates a response rate of 21%.

In this study, we focus on those who had been working during the previous 12 months and who were working in CCIs. Based on this our final sample consists of 410 creative professionals of which 64% were female and had tertiary or higher educational background (Table 1). The average age of respondents was 48.3 years. On average, they had 22 years of working experience in creative sectors. Around 57% of the respondents had only one profession: 30% of the respondents were actors, 54% worked as fine or visual artists and about 20% were musicians. Moreover, 23% had only one source of income, and among 29%, the education had covered at least some business studies (such as marketing, accounting, and entrepreneurship).

Variables

Dependent variable. Our dependent variable, income inadequacy, was measured by assessing respondent's perceived financial position. Instead of asking monthly income and expenses in euros and in order to avoid false responses or even loosing respondents because of too personal questions (Duncan & Petersen, 2001), we asked the respondents whether their monthly income exceeds, equals or does not cover their monthly expenses. We coded this into a dummy variable in which 1="*My monthly income doesn't cover my living costs*" and 0="*My monthly income cover or exceed my living costs*". Based on this item 34% of the respondents perceived income inadequacy, and hence, their monthly income does not cover their living costs.

Independent variables. We measured perceived creative and entrepreneurial identities separately with an adapted version of Farmer et al.'s (2011) identity aspiration scale. Their scale measures desirability of identities but it was adapted for our study to measure possession of identities. In the

questionnaire the respondents were asked to "*Please indicate how the following statements describe you*" on a scale ranging from 1="*Strongly disagree*" to 5="*Strongly agree*." Both scales covered six items, such as "*I often think about being a creative individual // an entrepreneur/freelancer*". The construct reliability (*CR*) for perceived creative identity was *0.87* and for perceived entrepreneurial identity *0.93* both of which reach the common threshold of 0.70 (Hair et al., 2010).

Moderating variable. In the questionnaire, we operationalized the business skills with an original scale comprising nine items, which reflected the nine dimensions of business model canvas (Greene, 2020; Osterwalder & Pigneon, 2010) and the entrepreneurial skills explored by Moberg (2013) and Bacigalupo et al. (2016). The participants were asked to "*Please indicate how well the following statements describe your artistic or creative work*" with items, such as "*I am good at identifying who my audience(s)/customers is/are*". All items were measured with a Likert-scale ranging from 1="*Strongly disagree*" to 5=*"Strongly agree*". We employed the nine items as a composite index in which higher value means higher perceived skills. The reliability statistics of this index (*CR=0.82*) also reach the common threshold of 0.70 (Hair et al., 2010).

Control variables. Previous studies pinpoint the gender differences of income distribution, and that women often earn less than men (Bobbitt-Zeher, 2007; Roszkowski & Grable, 2010). Therefore, we controlled the analyses for respondents' gender. Hennekam (2015) found that older creative professionals start their own businesses. This may also influence their income generation, and thus, we controlled the analyses for the respondents' age. Early-stage creative professionals seem to be self-employed more often compared to their older peers, and artists who leave self-employment obtain more stable employment conditions (Woronkowicz & Noonan, 2019). Moreover, individual's level of education and majoring subject might influence the personal income (Bobbitt-Zeher, 2007; Rodriquez-Pose & Tselios, 2009). Hence, we adjusted the analyses for the level of education by asking the respondent about the highest level of education they have completed (from primary education to advanced tertiary education). In the analyses this item was recoded into a dummy variable in which 1="*Tertiary or higher*". In addition, we controlled the analyses for an item, which explored whether the respondents' education covered any business subjects (such as marketing, management, and entrepreneurship). In the analyses this was used as a dummy variable in which 1="*Yes*" means that her education has covered at least some business subjects.

Moreover, low wages or even unpaid period at an early career phase is typical for creative workers (Bennett, 2018; Eikhof, 2013; Siebert & Wilson, 2013) and the development of individuals' identity

changes over time (Werthes et al., 2017). Hence, we controlled the analyses for the respondents' work experience in CCIs. Recent research has shown that creative professional are involved in multiple jobs and activities at the same time (Ball et al., 2010; Eikhof, 2013; Hennekam & Bennett, 2016; Wyszomirski & Chang, 2017). Therefore, we adjusted the analyses for the number of professions and for the number of sources of income. Table 1 summarizes the descriptive statistics and correlations of the variables used in the analyses.

Table 1. Descriptive statistics and correlations

	Mean	SD	1.	2.	3.	4.	5.	6.
1. Income inadequacy (1=yes)	0.34	0.47						
2. Business skills	29.5	6.31	-0.13*					
3. Creative identity	4.40	0.80	0.11*	0.05				
4. Entrepreneurial identity	2.93	1.20	-0.03	0.27*	0.26*			
5. Age	48.3	10.58	-0.02	-0.15*	0.02	-0.12*		
6. Gender (1=female)	0.64	0.48	0.18*	-0.00	0.05	-0.02	-0.07	
7. Education (1=tertiary/higher)	0.64	0.48	0.02	0.11*	0.06	0.00	-0.16*	0.07
8. Business studies (1=yes)	0.29	0.46	0.05	0.20*	-0.07	0.15*	0.01	0.09
9. Sources of income (1=one)	0.23	0.42	-0.17*	-0.06	-0.18*	-0.12*	0.10*	-0.06
10. Number of professions (1=one)	0.57	0.50	-0.06	-0.04	0.02	-0.15*	0.06	-0.06
11. Work exp. in CCIs	22.1	10.88	-0.06	-0.09	0.01	-0.05	0.83*	-0.14*
			7.	**8.**	**9.**	**10.**		
8. Business studies (1=yes)			-0.05					
9. Sources of income (1=one)			-0.07	0.10				
10. Number of professions (1=one)			-0.07	-0.09	0.06			
11. Work exp. in CCIs			-0.13*	-0.08	0.06	-0.01		

*n=410, *p<.05*

Results

In testing our hypotheses, we used hierarchical logistics regression analysis. Table 2 provides our regression results separately for main effects, interaction effect, and finally controlled models.

Our results show that higher perceptions of creative identity increase the likelihood of income inadequacy (*β=1.43*, *p<0.01*, Table 2). This result supports our hypothesis H1. In addition, our results show that perceived entrepreneurial identity is not significantly associated with the likelihood of income inadequacy, and hence, our hypothesis H2 is not supported. However, our results show that higher levels of perceived business skills decrease the income inadequacy (*β=0.96, p<0.05*). This result supports our hypothesis H3, which implies that business skills buffer the challenges concerning creative professionals' income.

Table 2. Logistic regression models testing the effect of perceived identities and their interaction with perceived business skills on income inadequacy

	Model 1	Model 2	Model 3	Model 4
	β	*β*	*β*	*β*
Creative identity	1.43**	1.44*	1.45**	1.30
Entrepreneurial identity	0.97	0.97	2.32†	1.95
Business skills	0.96*	0.96	1.04	1.00
Creative identity * Business skills		1.00		1.00
Entrepreneurial identity * Business skills			0.97*	0.98
Age				1.02
Gender (1=female)				2.00**
Education (1=tertiary or higher)				1.19
Education covered business subjects (1=yes)				1.59†
Sources of income dummy (1=one)				0.37**
Number of professions dummy (1=one)				0.83
Work experience in CCIs (years)				0.98
n	410	410	410	410
Nagel R^2	0.04	0.04	0.06	0.15

*DV=Income inadequacy (reference category 1=yes), †p<.10, *p<.05, **p<0.01, ***p<0.001.*
[a] Reference category: manager/entrepreneur, [b] From OLS regression analyses.

Finally, the models (2 and 3) with interaction terms show that perceived business skills do not interact with perceived creative identity's relationship with income inadequacy. Accordingly, the hypothesis H4a is not supported. However, the results illustrate that business skills moderate the relationship between perceived entrepreneurial identity and income inadequacy (*β=0.97, p<0.05*). The effect is small, but in order to detail this interaction, we plotted it (Figure 1). The results reveal that together with higher perceived business skills higher perceptions of entrepreneurial identity decrease the likelihood of income inadequacy. However, at lower perceptions of entrepreneurial identity the interaction is minimal. The latter implies that if creative professionals do not identify themselves entrepreneurial, the likelihood of income inadequacy remains low despite the level of business skills. At high level of perceived entrepreneurial identity, the income inadequacy is more likely, if one considers not having business skills.

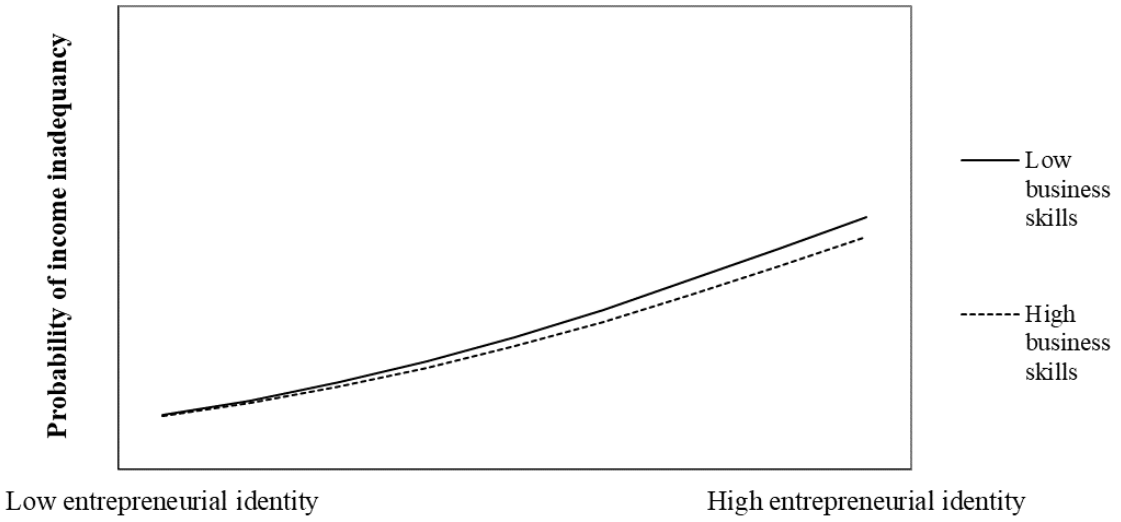

Figure 1. Effect of the interaction between perceived entrepreneurial identity and perceived business skills on income inadequacy

In addition to assumed relationships between identities, business skills, and income inadequacy, our results reveal that the likelihood of income inadequacy is twice as high among females in comparison to males. This supports the previous findings concerning women's lower earnings compared to men (Bobbitt-Zeher, 2007; Roszkowski & Grable, 2010). Furthermore, if creative professionals have an opportunity to generate their income via only one source, the likelihood of income inadequacy lowers. This implies that if one has a single solid source of income, such as steady monthly salary, income inadequacy is not an issue, but gathering the income from multiple sources is rather a reactive attempt to cope with income inadequacy.

Discussion and implications

Our study was set to investigate perception-based sources of income inadequacy among creative professionals. As highlighted in previous research, creative professionals often encounter low income (Cunningham et al., 2010) and their work is irregular or part-time or requires even having multiple jobs (Campbell, 2018; Comunian et al., 2011). Instead of investigating the work conditions, we focused on the role of identity and business skills in income inadequacy both of which influence the actions and decisions, which individuals make on their work.

Our findings suggest that of the two studied identities, perceived creative identity matters in creative professionals' income, but in a challenging way: Creative identity increases the likelihood of income inadequacy. This implies that adopting creative identity puts one's income formation at stake. Creative professionals' work identity is characterized by creativity, autonomy, and self-investment (Neff et al., 2005), which shape the roles individuals adopt and the ways they perform their work (Walsh & Gordon, 2008). Hence, it is both intriguing and alarming that while appreciating being creative, creative professionals implicitly accept the challenges of generating enough income to pay the bills. Theoretically, this implies that if identity is considered as a property, as something, which an individual has, adopting a certain identity can be an economic liability, but a personal asset at the same time (Radu-Lefebvre et al., 2021). Previous research has shown that creative professionals' earnings can be based on portfolio working and careers (Ball et al., 2010) through which they might seek to pursue both creative careers and conduct another jobs for making more or at least enough money (Bartleet et al. 2019; Tarassi, 2018) for a living. Still, this finding implies that the negative relationship between creative identity and sufficient income might even amplify the tension between being creative and income generation. Despite the fact that entrepreneurs in CCIs might develop an entrepreneurial identity (Werthes et al., 2017), our study did not find any support for the assumed relationship between entrepreneurial identity and income.

Alongside with perceived identity, we stressed to role of business skills in income inadequacy. Our findings show that higher levels of perceived business skills actually decrease the chances of income inadequacy. According to previous research, entrepreneurs in CCIs with strong entrepreneurial skills are not specifically oriented towards financial rewards (Cnossen et al., 2019). However, our findings suggest that creative professionals still benefit from having business skills. Indeed, creative professionals' employment conditions require skills to navigate through uncertainty and being creative in producing the creative outputs and finding ways to generate income (Bartleet et al. 2019; Wyszomirski & Chang, 2017; Scott, 2012). Furthermore, previous studies have also indicated that even if one would possess good business skills, self-employed creative professionals do not necessarily identify themselves as entrepreneurs (Coulson, 2012). Intriguingly, our findings suggest that together business skills and perceived entrepreneurial identity lower the chances of income inadequacy.

Theoretically, our findings contribute to the debate on the role identity (Stryker & Burke, 2000) and its meaning in guiding individuals' choices. Our findings highlight how creative and entrepreneurial identities differently influence the income of creative professionals. Among creative professionals, pursuing for creative identity decreases their income and the lack of support on the opposite role of

entrepreneurial identity further stresses this. The strength of self-concept and identity are important in predicting entrepreneurial action and its outcomes (Cardon et al., 2009, Farmer et al., 2011; Shepherd & Haynie, 2009). Hence, our study implies that perceiving oneself as a creative person, having a creative identity, is about how creative professionals want to perceive and define themselves in front of others (Berkman, 2014; Stryker & Serpe, 1994). It seems that the role identity overrides the economic realities of everyday life, and this might be part of how work conditions and work itself gives meaning and defines one's role identity (Dutton et al., 2010; Ibarra, 1999). Furthermore, our study contributes to the discussion on the interplay between identities and skills and their role in income generation among creative professionals particularly – a phenomenon which has not been extensively studied. Our findings show how business skills may buffer income inadequacy when one has strong entrepreneurial identity.

For the practice, our findings suggest that pursuing certain identity can have negative role in individual's economic viability. Furthermore, our findings suggest that teaching business skills is not enough if not taken place in fertile ground. The message for the educators is clear. It is important to provide students with opportunities to gradually assume an identity, which is also open for entrepreneurial endeavors already during the education. The need for supporting the development of artist identity and entrepreneurial business practices has been acknowledged and explored (Benzenberg & Tuominiemi, 2021; Bonin-Rodriguez, 2012), and our study suggests that business skills become an asset for a creative worker in securing one's income. To acknowledge the interplay of different skills and identities is important given the tensions between the aims of creating art and skills needed in mobilizing and managing the resources (Landoni et al., 2019; Sundbo, 2011) in an economically viable manner.

Limitations and future research

Our study explains how the creative identity and business skills separately and in interaction influence income inadequacy. Despite our promising findings, our research choices lead to some obvious limitations and offer fruitful opportunities for future work. First, we employ cross-sectional data that do not allow us to explore the dynamics of income generation. Moreover, we were unable to investigate any changes in business skills, which might benefit the creative professionals in their endeavors. In addition to possible longitudinal settings that might allow extracting changes in the income generation, future research should focus on studying how to enhance the role of business skills among creative professionals. Second, our study employs income measure, which is solely a perception of the income inadequacy. Accordingly, we cannot secure whether the respondent really

faces income inadequacy. Furthermore, the stated perception on income inadequacy is subjective and it does take into account that something may be enough for some but inadequate for others at the same time. To reach beyond this limitation, future research could explore that opportunities to use register data to detail the levels of income per creative profession.

In conclusion, our study highlights the interplay between different identities and business skills among creative professionals when pursuing creative activities for their living. Our study provides new insights into understanding income formation and suggestions on coping with unsecure income among creative professionals. Furthermore, our study also opens up new research avenues on this highly topical issue.

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The impact of public support for innovation on output additionality. Differences among small and large firms

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Abstract

The paper aims to study the effect of output additionality of public R&D/innovation funding on firm innovation, measured as economic returns of innovation, across firms of different sizes. A panel sample consisting of 4,950 Spanish firms observed during years 2009–2014 has been analysed, using a treatment model. Robustness tests have also been used. The findings show the effects of output additionality of R&D/innovation funding support for small, medium, SMEs and large firms, with a greater effect on large firms and a lower effect on medium firms. However, there has been a weak effect for very large firms, which do not benefit in terms of output additionality. Since it is relatively easy for large firms to benefit from public support for innovation, some of the resources allocated to them should be passed on to small and medium firms. Medium firms seem to be less inclined to benefit from economies of scales than large firms and may be less affected by public innovation policy given the priority for small firms' development. SMEs can benefit further from well-designed targeting programmes, with a prevalence of demand-side support measures compared to the supply-side measures.

Keywords

Public funding support, economic returns of innovation, output additionality, firm size, Spain.

Introduction

Literature has been empirically investigated the impact of public support on companies' innovation, chiefly focusing on additionality/crowding out (Clarysse et al., 2009; Hewitt-Dundas and Roper, 2010). In detail, previous research mainly analysed input additionality. Considering firm size, Carmichael

(1981) remarks that public funding had a greater impact on R&D expenditure in large companies than in small ones. Similar evidence is reported by Klette and Moen (1998), while González and Pazó (2008) found that the intensity effect of subsidies on private R&D was higher in firms with fewer than 200 employees. So far, less explored is the focus on output additionality (Herrera and Sánchez-González; 2013; Radicic et al., 2016; Cerulli and Potì, 2012) and, specifically, little evidence exists on the effect of public support on companies' innovation in terms of output additionality among small and large companies. Only Cerulli and Potì (2012) explored the impact of a specific R&D policy instrument on innovation input and output (in terms of patents) among small and large companies, suggesting that the program is better for large companies, while small companies get more benefits from targeted programs. However, small and medium enterprises (SMEs) are less apt to formal protection mechanisms such as patents than large companies (Leiponen and Byma, 2009). This calls for further investigations on the topic, including, in the analysis, the operational innovations and innovative sales (Radicic et al., 2016). The potential different impacts of public support on companies' innovation in terms of output additionality among small and large firms is fundamental to understand the effectiveness of the designed programs and better define actions for different types of firms. An exclusive analysis of the effects of public support on innovation input is an uncompleted approach, since innovation input activities (such as R&D expenditures) are not always translated in innovation output (Acs and Audretsch, 1993). Additionally, large companies in comparison to small companies mainly undertake formal R&D (Santarelli and Sterlacchini, 1990). This may underestimate the real impact of public policies. This paper fills this gap by analysing the impact of public support on companies' innovation in terms of output additionality among small and large firms on a sample of 4,950 Spanish firms observed during years 2009–2014 and using a treatment model.

Theoretical Framework

Considering firm size, studies focused on the output additionality effects with regard to the innovation outcome are limited compared to those focused on input additionality, as anticipated in the Introduction section. In this regard, the previous studies do not emphasise a homogeneous evidence about the effect of public policies for innovation on output additionality, revealing mixed effects.

In detail, about the studies remarking a positive effect in term of output additionality on small firms, Bronzini & Piselli (2016), analysing the innovation program during early 2000s in the Northern Italy, show a relevant effect on the number of patent applications, mainly in the case of smaller firms. Additionally, it improved their probability of applying for a patent. Further, Czarnitzki & Delanote (2015) have been assessed the existing effort of EU policy on independent, new and high-tech SMEs, remarking a positive effect of policy on innovation output (based on patent production framework).

Also, Radicic *et al*. (2016), evaluating the effect of innovation support programs on output innovation by European SMEs in traditional manufacturing industry, show a positive effect in term of likelihood of innovation and of its marketability.

Guo *et al*. (2016), investigating the effects of a government R&D program (Innofund) on innovation outputs of small and medium technology-based firms in China, show that Innofund-backed firms create considerably more technological and commercialized innovation outputs than non-Innofund-backed firms.

Other scholars remark a positive effect of public policies in term output additionally on small firms indirectly. Indeed, Zemplinerova & Hromadkova (2012), analysing a sample of large Czech firms, reveal that large firms are less effective in converting the innovation input into output and that access to subsidies has a substantial negative effect on innovation output.

About the studies highlighting a positive effect in term of output additionality on large firms, Cerulli & Potì (2012) have been explored the impact of a specific R&D policy instrument on innovation input and output (in terms of patents) among small and large firms, suggesting that the program is better for large firms, while small firms get more benefits from targeted programs. Likely, the low output additionality detected by Cerulli & Potì (2012) might be in part related to the circumstances that generally small firms are less apt to formally use protection instruments such as patent applications compared to large firms (Leiponen & Byma, 2009).

Further, other studies reveal mixed effects, positive and negative, of public support for innovation on output additionality. Herrera & Sanchez-Gonzalez (2013), analysing a sample of Spanish firms, suggest that with regard to the firm size, public subsidy rises firm' investment into technological development and applied research. In small firms, public support has improved sales growth of new products to the firm, while in large firms it has improved sales growth of new products to the market.

Radicic & Pugh (2017) have been investigated the impact of national and international R&D programmes on innovation, in term of input and output additionality, of European SMEs. About output additionally, their findings reveal a positive treatment effect about the propensity for patent applications, but no additionality effects are detected on innovative sales.

The previous studies are not closely comparable and findings are not definite: they indeed diverge in their results, in the support policies investigated, in the period evaluated, in the methodological approach used for sampling procedure and in the econometric analysis. Current knowledge about the association between innovation policy and firm size is unsatisfactory for policymakers to make up-to-date decisions about policy proposals, planning and distributions of the strategic resources and incentive to prioritize core technologies and knowledges, calibrating tailored actions for small and large firms.

In general, the literature has not dealt with analysing how public funding support for innovation affects innovation output, especially its economic returns, with respect to the firm size. It still remains unclear whether public R&D/innovation subsidies are productive and whether their impact is higher considering different firm sizes.

However, if we go inside theory, it is possible to underline that firm size is a fundamental differentiation factor. In this regard, the element that may have a critical role in the output additionality in term of innovation output and its economic returns - and that is linked to the firm size - is scale economies.

In this regard, literature point out that large firms might have the benefit of scale, having additional resources accessible to develop new knowledge and new products (Cohen & Klepper, 1996; Cohen, 2010). They may also take advantage from the economies of scope, and hence developing several products in different markets from a specific piece of newly generated knowledge (Granstrand et *al*., 1997). But, small firms are supposed to have a greater inducement to innovate yet (Baumol, 2010) and take advantage from resources available from public support for innovation. They may not be limited as much to a current customer and knowledge base and might be more oriented at switching significant knowledge inside the firm (Szulanski, 1996). Additionally, SMEs need to introduce innovation in the market and benefit from new technologies (Hadjimanolis, 1999). Indeed, offering innovative products, with enhanced utility, may support SMEs in strengthening their competitive position in the market (Buse *et al*., 2010).

However, taking into account the Schumpeter's Mark II paradigm of the innovation process, it is to note that large firms can assume to gain superior economic return from economies of scale in R&D, distributing R&D expenses over a greater base (Acs & Audretsch, 1987; Cohen, 2010). Large firms can more simply train their workforces or let them to improve skills and competences that might not give growth to direct advantages (González *et al*., 2016; Cohen, 2010), since they have additional resources ready to use or more simply accessible from the capital market (Pla-Barber & Alegre, 2007; Uhlaner *et al*., 2013). Specialization of knowledge within divisions of labour is therefore more willingly practised in large firms compared to small firms, usually through qualified partnerships with other firms, giving increase to enhanced managerial (Uhlaner *et al*., 2013) and technical know-hows (Stock *et al*., 2002). Products innovations advanced in large firms may be took profitably to the market since further complementary assets and skills are obtainable in a large firm (Cohen, 2010; Stock *et al*., 2002). Consequently, innovations that have advanced may be more willingly exploited in different and related markets (both local and global); and once innovations are established to a phase where they can be took to the market, the potential profits are greater for large firms compared to small firms (Cohen, 2010).

These arguments take a critical meaning in the case of output additionality of public funding support for innovation, integrating and reinforcing their effects. Indeed, the literature remarks that when project/firm is large, public support can produce additional R&D spending (Potì & Cerulli, 2011). This happens in the case public financial support makes it probable to go beyond a definite level of project/firm expenditures, hence allowing the firm to finalize the innovation process. Thus, it is possible to argue that, by letting the firm to allow the innovative project' high fixed expenditures, the grant produces benefits like as "economies of scale".

Hence, large firms tend to show additionality more frequently than small firms. These differences seem to be related to the additionality group' better capacity to turn inventive inputs (mainly R&D intensity) into innovative outputs (in the case of this paper, the percentage of sales of new product innovations introduced by the firm). On the base in these arguments, the following research hypothesis is advanced:

Research hypothesis: Large firms show greater output additionality of public funding support for innovation compared to small firms.

Data and methodology

We use firm-level data obtained from the Technological Innovation Panel (PITEC), which contains information on Spanish firms' innovation activities and comprises active firms in all economic sectors. PITEC is based on the Community Innovation Survey (CIS) framework. After cleaning data, our final dataset resulted in 4,950 firms, from 2009 to 2014, for which we have 24,750 observations.

Following previous contributions on measures of innovation output (Cassiman and Veugelers, 2006; Hewitt-Dundas and Roper, 2010), the here used indicator is the percentage of sales of new product innovations introduced by the firm (INNOVATION). The variable aims to reflect the additional effect of public support on radical product change (Hewitt-Dundas and Roper, 2010).

We define a supported firm as one that at least received one of the R&D/innovation funding from local/central government and from the EU (TREATMENT); it is considered as potential control a firm that did not receive at least one of the above-mentioned funding.

In order to evaluate the potential different impacts in terms of output additionality among small and large firms, we use five classes of firm size: small firms (<50 employees), small and medium enterprises (SME) (< 250 employees), medium firms (>50 & <250 employees), large firms (>250 employees), very large firms (>500 employees).

Finally, a set of control variables is included: AGE (number of established years), SIZE (number of employees), PRODUCTIVITY (sales per employee), COOPERATION (dummy if firm involved in innovative cooperation activity), TRAINING (ratio of total costs in innovation for training activities), EXPORT (volume of exports activities), CAPITAL INTENSITY (equipment stock intensity), year dummies to control time effects and sectoral dummies to control for effects at industrial level, following the CNAE-2009, 4-digits (codes from 0000 to 0043).

Within this sample the supported units are 2,399 (47.25%), the non-supported units 2,611 (61%) (Table 1). The average percentage of sales of new product innovations is 14.69 in supported firms and 9.93 in non-supported firms.

Table 1. Descriptive statistics

	All firms of the sample		Supported firms		Non-supported firms	
Number of observations (%)	24,750		11,695 (47.25%)		13,055 (52.75%)	
Variables	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.
INNOVATION	12.1749	24.26774	14.6856	25.8482	9.9257	22.5235
AGE	29.7405	21.2359	28.3324	20.0616	31.0019	22.1601
SIZE	391.4515	1890.8710	411.9950	1827.5150	373.0481	1945.7620
PRODUCTIVITY	256207.7000	675288.4000	230070.2000	435881.2000	279622.4000	832584.1000
COOPERATION	0.4621	0.4986	0.6564	0.4749	0.2879	0.4528
TRAINING	1.2911	7.9437	0.7959	5.0520	1.7347	9.8160
EXPORT	3072.5850	481578.9000	11.8399	19.6434	5814.4770	663081
CAPITAL INTENSITY	4.9501	12.3444	6.3951	13.5394	3.6557	11.0065

The used econometric approach is drawn on the studies on program evaluation (Wichman and Ferraro, 2017), which aims to estimate the average treatment effect on the subjects interested by the policy program. Based on the application of this methodology on R&D/innovation policy (Cerulli, 2010; Cerulli and Potì, 2012), our approach consists in two behavioural equation: the first refers to the treated status and the second refers to the untreated one. In order to overcome the arising missing observation issues (since each company is observed only in one of the two conditions), we use the hypothesis of "conditional mean independence" for estimating, by a standard OLS, the own innovation model as a function of the treatment dummy variable and the control variables. We estimate two parameters: the Average Treatment Effect (ATE) and the Average Treatment Effect on Treated (ATET), along with these effects conditional on x. Additionally, the Average Treatment Effect on Non-Treated (ATENT)), together with this effect conditional on x, can be also estimated. Hence, the following equation is estimated:

$$E(y \mid \mathbf{x}, w) = \gamma + \mathbf{x}\boldsymbol{\beta}_0 + w \cdot ATE + w \cdot [\mathbf{x} - \boldsymbol{\mu}_{\mathbf{x}}]\,\delta \,. \quad (1)$$

where *w* is the treatment dummy variable and μ_x is the mean of the vector of covariates x.

The coefficient of *w* is the ATE, the ATE(x), ATET and ATET(x) are found by transformation of the parameters and variables enclosed in the estimation of Equation (1).

Results

Table 2 reports results for the ATE(x), ATET(x) and ATENT(x). The findings show that ATE(x), ATET(x) and ATENT(x) are positive and statistically significant. The current relation among these three parameters, stated by Equation (1), is completely satisfied in our empirical estimation.

Table 2. Estimation of ATE(x), ATET(x) and ATENT(x).

	Observed coefficient	Std. Err.	t(z)*	P-value
ATE(x)	2.1118	0.3344	6.32	0.000
ATET(x)	2.1526	0.3411	6.31	0.000
ATENT(x)	2.0754	0.3368	6.16	0.000

Notes: Standard errors for ATET and ATENT are obtained via bootstrapping. *t-statistic is calculated for ATE(x), z-statistic is calculated for ATET(x) and ATENT(x).

Table 3 shows the effect of the treatment dummy on the innovation variable for the pooled sample and by firm size. The findings show a positive and statistically significant ATET of the public support for small firms (column 3: coeff. 2.3970, p<0.001), for medium firms (column 4: coeff. 1.5699, p<0.01), for SMEs (column 5: coeff. 1.9399, p<0.001) and large firms (column 6: coeff. 3.2705, p<0.001); while very large firms report a positive but not statistically significant ATET. However, the higher ATET is reported by large firms, followed by small firms and SMEs (which comprise small firms too). This result suggests a superior effect of the public support on innovation in terms of output additionality in large firms compared to their smaller counterpart. Nevertheless, very large firms seem not to be affected by public support in terms of output additionality.

Table 3. ATET: OLS comparison for different firm size.

	Pooled sample		Sample by firm size				
			SMALL <50	MEDIUM >50&<250	SME <250	LARGE >250&<500	VERY LARGE >500
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TREATMENT(t)	4.7599***	2.1526***	2.3970***		1.9399***	3.2705***	0.4103
	(0.3066)	(0.3411)	(0.6411)	1.5699***	(0.3388)	(0.8860)	(0.9830)

				(0.5119)			
AGE		-0.0368*** (0.0079)	-0.0573*** (0.0190)	-0.0462*** (0.0138)	-0.0542*** (0.0112)	-0.0236 (0.0164)	0.0051 (0.0159)
SIZE		0.0000 (0.0001)	-0.0625*** (0.0231)	-0.0082 (0.0062)	-0.0035 (0.0038)	-0.0014 (0.0076)	0.0000 (0.0001)
PRODUCTIVITY		0.0000** (0.0000)	-0.0000* (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000* (0.0000)	0.0000 (0.0000)
COOPERATION		3.0938*** (0.3278)	3.6712*** (0.5468)	2.3768*** (0.5314)	3.1738*** (0.3816)	2.4684*** (0.9491)	3.9774*** (0.9632)
TRAINING		-0.0588*** (0.0130)	-0.0611*** (0.0193)	-0.0495 (0.0346)	-0.0621*** (0.0172)	-0.0159 (0.0282)	-0.0729*** (0.0165)
EXPORT		-0.0000*** (0.0000)	0.0034 (0.0033)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	0.0048 (0.0285)	0.0622* (0.0328)
CAPITAL INTENSITY		0.0621*** (0.0132)	0.0600*** (0.0201)	0.0778*** (0.0236)	0.0697*** (0.0153)	0.0324 (0.0359)	0.0501 (0.0395)
Sectorial dummies		YES	YES	YES	YES	YES	YES
Year dummies		YES	YES	YES	YES	YES	YES
N. Observations	24,750	24,750	10,842	8,551	19,393	2,611	2,746
N. of observations treated	11,695	11,695	4,837	4,157	8,994	1,282	1,419
R-squared	0.0096	0.0443	0.0515	0.0535	0.0457	0.0717	0.0862
Adjusted R-Squared	0.0095	0.0422	0.0468	0.0476	0.0430	0.0528	0.0682
Root MSE	24.152	23.75	24.759	23.224	24.158	21.736	22.048
DF	1	54	53	52	52	51	53

Notes: standard errors in parentheses; *p < 0.1, **p < 0.05, ***p < 0.01.

Conclusion

This research extends our understanding about the impact of public support for innovation, on firms' innovation, in terms of output additionality. Our results remark a positive impact of R&D/innovation funding support on output additionality for small, medium and large firms, with a higher effect on large firms. Hence, this finding is consistent with the view that public supportive programs to R&D/innovation are more suitable for large firms, while small firms may potentially reach results that are more effective in terms of innovation additionality with a conjunction of general and targeted programs. However, the non-emerging effect on very large firms may indicate that since these firms attempt to develop a broad knowledge base to enable them to preserve their competitive advantage, they invest more in in-house R&D and the need of public support for innovation is not highlighted. These results provide policy makers with a clearer picture about the impact of R&D/innovation funding support on output additionality at firm level and what to expect as well as what not to expect among small and large firms, in order to better define and adjust their promoting actions.

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Students' entrepreneurial bricolage and entrepreneurial action: the mediating effect of innovative behavior.

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Abstract

Student entrepreneurs are key contributors to innovation and the creation of new ventures. Given that this group of people suffers from high resource constraints, higher education institutions have an important responsibility to help them develop the behaviors that facilitate the identification and use of the resources they require. Recent research has investigated the relationship between bricolage and entrepreneurial action; however, studies about this relationship in the context of student entrepreneurs remain insufficient. Likewise, despite the importance of innovative behavior in student entrepreneurs, very little attention has been paid to its role in the entrepreneurial process. Further research is needed to understand more thoroughly the relationship between entrepreneurial bricolage and entrepreneurial action, and to analyze the role of innovative behavior in this relationship. This ongoing research presents a review of the literature on these topics and proposes a methodology to analyze the relationships among them.

Keywords

Entrepreneurial action, entrepreneurial bricolage, innovative behavior, student entrepreneurs

Introduction

Student entrepreneurs are recognized as new key drivers of economic and social development (Astebro et al., 2012; Mars, 2009; Mars & Rhoades, 2012). However, as nascent entrepreneurs, many student entrepreneurs face considerable challenges due to resource constraints. This situation mainly stems from their lack the social capital (Shane & Stuart, 2002), entrepreneurship knowledge, and

entrepreneurial experience (Hägg & Kurczewska, 2019). In fact, constraints of resources in entrepreneurs can increase the levels of complexity (Kautonen et al., 2015) and uncertainty (McMullen & Shepherd, 2006) causing entrepreneurial intentions not to turn into actions (Bogatyreva et al., 2019; Joensuu-Salo et al., 2015; Krueger; 2009; Schlaegel & Koenig, 2014), and consequently blocking the entrepreneurial process. This suggests that the study of how entrepreneurs can develop and use behaviors to overcome resource constraints is crucial today (Clough et al., 2019; Williams, et al., 2021).

Student entrepreneurs are emerging adults who create new ventures in the context of universities and who engage with complex processes such as product development, organizing operations, developing organizational strategies, and achieving initial sales (Souitaris et al., 2007). Previous studies in the field have extensively addressed students' entrepreneurial intentions (E.g. Turker & Selcuk 2009; Moriano, 2012; Souitaris et al., 2007). However, such postulates are unsatisfactory because it is entrepreneurial actions, understood as "the concrete and theoretically observable actions of individuals in the start-up or early stages of organizational creation" (Bird et al., 2012, p. 890), what really defines an entrepreneur.

Another relevant characteristic of student entrepreneurs is that they have a specific resource logic (Politis et al., 2012), due to the resource constraints they constantly face. This means that, in this domain, resourcefulness can play a paramount role in helping entrepreneurs cope with the problems of starting a business (Bradley et al., 2011), as it could help them identify novel and clever ways to bring in, gather, and deploy resources (Williams et al., 2020). More specifically, one of the resourceful behaviors that entrepreneurs can develop is entrepreneurial bricolage behavior (EBB) (Baker & Nelson, 2005), which is "making do with the resources at hand, recombining resources for new purposes, refusing to enact constraints, and predisposing to action" (Davidsson et al., 2017, p. 117). EBB may also enable student entrepreneurs to develop innovative behavior (IB) (Gundry et al., 2011), and this set of behaviors can, in turn, facilitate entrepreneurial action (EA) (Rauch & Frese, 2007; Zhou et al., 2021).

Despite recent interest in the study of EA, researchers largely overlook how entrepreneurs seek resources in the initial process of new venture creation (Clough et al., 2019) and how, within this context, they develop their IB (Kistyanto et al., 2021). Related literature has also highlighted the importance of investigating how entrepreneurs interpret and maximize the benefits of resources as a relevant insight to understanding the creative uses they might have (Feldman & Worline, 2012; Sirmon et al., 2011; Williams et al., 2019). Specifically, Welter et al. (2016) call for a deeper understanding of the relationship between bricolage and EA with a particular focus on the entrepreneurial actor, which,

in the university context, includes the student entrepreneur, who surprisingly had not received sufficient attention in the literature (Nielsen & Gartner, 2017).

This paper attempts to contribute to the literature on resource management at the individual level in entrepreneurship, deepen the understanding of the relationship between EBB and EA, and explore the role of IB in student entrepreneurship. The paper is guided by two questions. On the one hand, to what extent does EBB influence students' EA? And, on the other, how EBB affects EA through IB in student entrepreneurs? In this ongoing study, we aim at applying an integration of sensemaking (Weick, 1979, 1995) and the structuration (Giddens, 1984) theories proposed by Pryor et al. (2016) to determine the effect that EBB has on EA as well as the mediating role of IB in such process.

To reach its purpose, the paper first offers an in-depth examination of the literature; second, an initial hypothesis to be examined is proposed. The research methodology is then addressed and, finally, the last section draws on some concluding thoughts.

Theoretical framework

Existing research has defined EA as the behavior that emerges in response to a judgmental decision—usually, a decision one needs to make when being uncertain about a possible profit opportunity (McMullen & Shepherd, 2006). Nevertheless, given that not all entrepreneurs aim to generate profits (Glaeser & Shleifer, 2001), this research aligns with the definition of EA proposed by Bird et al. (2012, p. 890) who define it as the "concrete and theoretically observable actions of individuals (as solo entrepreneurs or as part of a team of entrepreneurs) in the start-up or early stages of organizational creation". EA as an individual's action is based on cognitive structures that are represented in observable behaviors. For this reason, in order to address the questions of this research from a theoretical basis, we apply the integration of the theories of sensemaking (Weick, 1979, 1995) and structuration (Giddens, 1984) proposed by Pryor et al. (2016). These theories provide a framework for how behavioral and cognitive mechanisms influence the entrepreneurial process. With this framework, we account for the fact that the conceptualization of an opportunity and the actions to exploit it are supported by the beliefs and behaviors of entrepreneurs.

Specifically, the theory of sensemaking (Weick, 1979, 1995) explains how our beliefs, or the initial ideas or assumptions we have, are created. These beliefs can emerge from exogenous forces, such as unexpected conditions; or from endogenous forces, such as creativity and imagination. It is through sensemaking that individuals assign meanings to a gap in their understanding of a new situation, so individuals can form new beliefs and conceptualize them into behaviors. By contrast, the theory of

structuration (Giddens, 1984) explains how the rules and resources of the social structure in which an individual is immersed guide and constrain the behaviors of the individuals who, in turn, influence the social structure. It is from these interactions between the individual and the social structure that scripts are created. We conceive scripts as patterns of behavior that an individual will use in certain situations, and that will eventually accumulate in his or her memory.

By using the integration of these two theories proposed by Pryor et al. (2016), it is possible to understand how scripts (structuration) interact with cognitive processes (sensemaking) and vice versa. Likewise, we can see how those scripts interact with the social structure to exchange information and meanings so as to advance in the entrepreneurial process. From the experiences that entrepreneurs acquire and the influence of the social structure, the signification scripts (structuration) are formed, influencing how entrepreneurs search and interpret information. From these scripts, entrepreneurs also form beliefs (sensemaking) about opportunities or solutions to create value. The scripts that allow understanding of how the environment works are known as legitimation scripts (structuration), which facilitate the mobilization of resources to conceptualize solutions and business plans. They also influence the selection process (sensemaking) that supports the incorporation of the feedback they receive from social interactions. Guided by domination scripts (structuration), entrepreneurs obtain the necessary resources to launch the venture, which leads to the retention process (sensemaking) where entrepreneurs create new ventures and transform (or not) behaviors into routines or capabilities within the venture.

Entrepreneurial Action (EA)

In line with the concept of EA proposed by Botha and Pietersen (2020) based on Shane and Venkataraman (2000), EA is composed of discovery and exploitation activities. Discovery activities are defined as those that are part of the conceptual aspect of new venture development (Farmer et al., 2011), and involve actions such as early-stage venture idea generation, identification of market opportunities, and assessment of the feasibility and desirability of the venture concept (Vogel 2017). To a greater extent, sensemaking theory (Weick, 1979, 1995) explains how entrepreneurs carry out discovery activities using cognitive processes such as attention, selection, and retention to generate beliefs about the existence of an opportunity, the conceptualization of solutions, and the acquisition and use of resources. On the other hand, exploitation activities are the concrete behaviors that are carried out to implement the venture idea. They implicate acquiring the necessary resources, creating a legal entity, and registering with tax authorities (Muelle et al., 2012). Structuration theory (Giddens, 1984) facilitates the understanding of discovery activities within the entrepreneurial process,

explaining how entrepreneurs use imagination to guide new activities, mobilize resources to deliver the solution to the market, and launch the venture. By adopting these perspectives, this research extends theorizing how entrepreneurs approach resource constraints and how entrepreneurial behaviors influence EA.

Research in the field of EA has been mostly theoretical (Dimov & Pistrui, 2020; McMullen and Shepherd, 2006; Smith and Gregorio, 2017; Townsend et al., 2018; Watson, 2013). With regard to empirical research, EA has been studied in relation to uncertainty (Autio et al., 2013; McKelvie et al., 2011), access to information (Autio et al., 2013; Butler et al., 2003), the influence of context (Meek et al., 2010), and more recently analyzing how university-based entrepreneurial ecosystem characteristics, pedagogical approaches, and students´ personal traits affect EA (Dakung et al., 2017; Gielnik et al., 2015; Kwapisz et al., 2021; Lynch et al., 2021; Noyes, 2018; Rushworth et al., 2016; Saiz-Álvarez & Rodríguez-Aceves, 2019; Wood et al., 2014).

The effect of Entrepreneurial Bricolage Behavior (EBB) on Entrepreneurial Action (EA)

The literature on entrepreneurship has highlighted that the entrepreneurs' identification and optimal use of resources are required in EA, which, following the sensemaking and structuration theories, also plays a crucial role to move forward in the entrepreneurial process. By resources, we mean "all tangible and intangible assets controlled by an entrepreneur, or accessible through social ties, that enable him or her to exploit a venture opportunity" (Clough et al., 2019, p. 3). There are several typologies of resources needed in the early stages of entrepreneurship. For example, Cooper et al. (1994) classify them into human capital, social capital, industry-specific knowledge, and financial capital. These resources are important for student entrepreneurs, as having access to them is one of the main drivers of entrepreneurial activity (Alves et al., 2019). However, as aforementioned, student entrepreneurs lack sufficient experience and knowledge to identify and access these resources (Dolmans et al., 2014; Ngoasong, 2018; Trivedi, 2017; Wright, 2017). Under these circumstances, entrepreneurs need to develop behaviors that, regardless of resource ownership, can enhance their ability to use and extract value from these resources (Politis, 2012). These behaviors are referred to as resourceful behaviors, as is the case of bricolage (Williams et al., 2021).

Entrepreneurial Bricolage Behavior (EBB) has been defined as "making do with the resources at hand, recombining resources for new purposes, refusing to enact constraints, and predisposing to action" (Davidsson et al., 2017, p. 117). According to this definition, EBB is intimately linked to action, for example, *making do* includes a predisposition to action (Archer, 2009; Janssen et al., 2018), and according to Michaelis et al. (2021) resourcefulness is an assumed antecedent of action.

Related literature has highlighted the positive relationship between bricolage and the development of new ventures (Guo et al., 2018; Senyard et al., 2014), startup performance (Ma & Yang, 2021; Salunke et al, 2013), sustainable business performance in technology startups (Sivathanu & Pillai, 2019), survival of early ventures (Stenholm & Renko, 2016), strategic flexibility and growth capacity of startups (Yu and Wang, 2021), startups' value creation (Valliere & Gegenhuber, 2014), and as a way to create resource barriers for competitors (Kalogerakis et al., 2010). One of the main streams of research on bricolage has been in the field of social entrepreneurship (Janssen et al., 2018; Servantie & Rispal, 2018), however, research on bricolage in the context of social entrepreneurship is still in its infancy (Poornima & Rajini, 2021), as it is in relation to other types of entrepreneurship, for example, student entrepreneurship. In the field of education, and specifically in relation to student entrepreneurs, EBB has not been investigated in depth (Rieple et al., 2017). The research by Zhou et al. (2021) is one of the very few studies in this field where the entrepreneurial resource bricolage capability of university students is assessed. Considering the connection between EBB and EA, the following hypothesis is proposed:

Hypothesis 1 (H1): Entrepreneurial bricolage behavior has a positive influence on the entrepreneurial action of student entrepreneurs.

The Mediating Effect of Innovative Behavior (IB)

For entrepreneurs, resources are essential to innovate (Bakar & Ahmad, 2010; Pan et al., 2018). They are necessary for the creation, implementation, and development of solutions and ventures (Hoegl et al., 2008). Nevertheless, it is worth stressing that entrepreneurs encounter difficulties in accessing the resources they require, and they need to develop behaviors to overcome the constraints. Bricolage becomes therefore central to facilitating the identification, access, and use of these resources. In fact, an important amount of research has identified a positive relationship between bricolage and innovation in firms, for example in service innovation (Salunke et al., 2013), new product development (Wang et al., 2021), launching of creative products (Wu et al., 2017), and in general with the generation of innovations (Li & Zhu, 2014; Senyard, et al., 2009; 2011; Senyard et al., 2014). It is important to highlight the fact that individuals are the ones who, through their knowledge, skills, and behaviors, take the initiative and execute the process of innovation within the firms (Koellinger, 2008; Li et al., 2018). Tidd and Bessant (2009) define IB as the one that facilitates the development of creative ideas that can be successfully implemented as products, services, procedures, theories, and strategies that are useful or meaningful to the intended audience. According to Dyer et al. (2008), entrepreneurial individual innovative behaviors involve patterns such as (1) questioning, which is the propensity to

constantly ask questions that challenge the status quo, and have a futuristic outlook; (2) observing, which involves time spent observing the environment, focusing on everyday experiences that inspire new ideas; (3) experimentation, which favors exploration with a hypothesis testing mentality; and (4) idea networking, or the way in which ideas are tested with a network of individuals.

On the one hand, despite the importance of the IB for entrepreneurs, research on EBB and IB at the individual level of entrepreneurs has been scarcely addressed. According to some studies, it can be deduced that IB generates a moderating effect between EBB and other variables related to entrepreneurship. For example, Steffens et al. (2022) found that IB contributes to the competitiveness of nascent operating firms if they present an expectation of growth; however, in the case of less ambitious firms, they found that IB can be detrimental to competitiveness. One possible explanation for this could be that more ambitious entrepreneurs exhibit more innovation-driven behavior than less ambitious entrepreneurs, as suggested by empirical research (Fernandez-Serrano et al., 2019; Gundry & Welsch, 2001). In other words, IB can positively influence some of the problems generated by the exclusive use of bricolage. This is because it plays a crucial role in facilitating growth expectations (Castaño et al., 2016). However, research on IB in relation to bricolage behavior and EA presents relevant evidence that it is a mediator of this relationship. Innovation is considered to be an outcome of bricolage, for example, Gundry et al. (2011) found a positive relationship between entrepreneurial bricolage and catalytic innovation, Salunke et al. (2013) demonstrated how entrepreneurial service firms use bricolage to innovate; and Guo et al., (2016) identified that entrepreneurial bricolage together with opportunity recognition are a source of business model innovation. At the level of individual entrepreneurs at the bottom of the pyramid, bricolage has been identified as a source of IB (Linna, 2013), and also in the context of engineering projects, bricolage has also been found to be a source of IB (Benouniche et al., 2014).

On the other hand, given the long-standing theoretical association between entrepreneurship and innovation, the relationship between IB and EA has received surprisingly little attention. Innovation has been considered a source of entrepreneurship, and entrepreneurship is an enabler of innovation (Zhao, 2005). Entrepreneurs are commonly described as innovative individuals (Block, 2017; Gurol & Atsan, 2006; Hébert & Link, 2006), who transform ideas into products or systems and are able to successfully implement, modify and commercialize them (Gabor, 1970). Entrepreneurs apply their IB to innovation processes to launch an invention or a new venture (Utterback, 1994). The importance of both the strategy and the innovation processes within a new venture is clear, but without the innovative behavior of the entrepreneurs, these mechanisms would not exist in a deliberate way. Rosenbusch et al. (2011) found a positive association between innovativeness and small business performance is stronger for younger firms, and Mueller and Thomas (2001) have a similar approach to

innovativeness as a significant precursor of EA. Empirical results on the relationship between IB and EA have generally shown a positive relationship. This is evident in the meta-analysis carried out by Rauch and Frese (2007), where the innovativeness was positively related not only to EA but also to firm performance.

As mentioned previously, EA is composed of discovery and exploitation activities. The former requires entrepreneurs' IB for the recognition of a problem or opportunity, the search for relevant information from different sources, and the generation of ideas to address the problem (Paine & Organ, 2000; Zhang & Bartol, 2010). Whereas exploitation activities require entrepreneurs to use their IB to put their creative ideas to work (Baer 2012; Yuan & Woodman 2010), in other words, to create a new venture. IB and its relationship to discovery and exploitation activities have been scarcely addressed in the context of student entrepreneurs (e.g. Harkema & Schout, 2008). From an empirical point of view, Kim et al., (2018) based on a cognitive-behavioral approach investigated the relationship between IB and opportunity recognition in college students, they found that IB is a strong inducer of opportunity recognition. Considering the connections that IB has with EBB and EA, the following hypothesis is proposed:

Hypothesis 2 (H2): Innovative behavior mediates the relationship between entrepreneurial bricolage behavior and entrepreneurial action.

Methodology

The purpose of this study is to investigate the relationship between entrepreneurial bricolage behavior (EBB) and entrepreneurial action (EA), and the mediating effect of innovative behavior (IB) on this relationship. Data will be collected from volunteer and anonymous student entrepreneurs from several regions and university organizations in Spain. Specifically, they will be students of the undergraduate degree of Entrepreneurial Leadership and Innovation (LEINN). Students of this degree have to develop entrepreneurship projects, which are consolidated in the 3rd year of the program. The participating organizations are Mondragon University, in the cities of Irun, Oñate, and Bilbao; TeamLabs in Madrid and Barcelona; and Florida University in Valencia. We seek to have 168 participants, who must be taking their third year of studies.

It is noteworthy that the study will be longitudinal. The first data collection date will be in May 2022 with third-year students. The second is scheduled for March 2023, when the same group of students is in their fourth year.

Measurements. The scales that will be used have been validated in previous studies: Entrepreneurial action (EA) will be measured with 17 items from Botha and Pietersen (2020). This scale includes six items for discovery activities and eleven items for exploitation activities. Entrepreneurial bricolage behavior (EBB) will be measured with 10 items from Davidsson et al. (2017). And Innovative behavior (IB) will be measured using 19 items from Dyer et al. (2008). This scale includes six items for questioning, four items for observing, five items for experimenting/exploring, and four items for idea networking. All items were measured on a 7-point Likert scale from strongly disagree or never (1) to strongly agree or always (7).

Prior to the beginning of this study, the scales were also translated from English to Spanish using the most used technique of back-translation (Brislin, 1970). A pilot test of the instrument was conducted with 14 students and, following the results, some adjustments have been made to the protocol as well as to the instructions of the instrument.

Several control variables will be used for the scope of this study. These include gender, age, country of origin, entrepreneurial family members, previous experience in entrepreneurship, and previous business experience.

Analytical approach. Since this is an ongoing research, preliminary results are not yet available. However, we have decided to utilize Partial Least Squares - Structural Equation Modeling (PLS-SEM) so as to identify degrees of prediction and to provide an explanation of the constructs we have used (Hair et al., 2017). We have chosen PLS because the research model is complex according to the type of relationships hypothesized (direct and mediation). Another relevant reason for using PLS is the nature of the variables and composites. Given that this study relies on a composite measurement model with a reflective design approach (Mode A), the use of traditional PLS is highly recommended (Sarstedt, et al. 2016). Importantly, to estimate the sample size and evaluate the statistical power of analyses, we will also use the G*Power 3.1 software (Faul et al., 2009).

Conclusions

Using the integration of sensemaking (Weick, 1979, 1995) and the structuration (Giddens, 1984) theories proposed by Pryor et al. (2016) provides a solid foundation for the understanding of how cognitive mechanisms and individual behaviors enable entrepreneurs to move through the entrepreneurial process, which is intimately linked to what entrepreneurial action represents. These theories also explain how bricolage and innovative behavior are related to the identification and use of resources, and to the generation of solutions and creation of new ventures. Similarly, these theories

recognize the importance of the environment, or the social structure, with which entrepreneurs constantly interact to, form their scripts and, hence, develop the beliefs they need to carry out their actions.

The work presented here provides one of the first investigations about the relationship between EBB and EA in the university context. It also provides new insights into how the individual innovative behavior of entrepreneurs acts as a mediator of the relationship between bricolage and EA.

The study has presented a review of the literature on the topic of entrepreneurial action and identified the need to explore the identification and use of resources to understand more effectively the effects the behaviors might have on the entrepreneurial action.

In fact, it is hoped that this research will contribute to a deeper understanding of this sort of action. We attempt to investigate the impact of resource behaviors, such as bricolage, which has been barely explored in university contexts and in relation to entrepreneurship. Moreover, the study makes a major contribution to research on innovative behavior. That is, it considers a mediator between EBB and EA, so it facilitates mutual understanding of how entrepreneurial students form their behaviors to successfully cope with difficult, stressful, and challenging situations— something that is fairly new in the literature (Cunha et al., 2014).

Finally, we endeavor to fill in the existing gaps in the literature on resource management in entrepreneurship, specifically from a behavioral approach. By using a longitudinal perspective in this study, which will also be conducted in different university contexts, it might be possible to see more in detail the development of students' entrepreneurial behaviors over time and in different environments. This improved understanding might also be of great value to higher education institutions, faculties, mentors, and students, who will gain insights into the development of behaviors through the entrepreneurial process.

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Digital transformation of the SME

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Abstract

In recent years, digital transformation has emerged as a strategic way to improve communication within organizations and enhance collaboration with key external stakeholders, such as customers, suppliers, distributors, and government representatives (Meroño-Cerdan et al., 2007). The adoption of digital business is perceived as a way to achieve sustainable competitive advantage in an increasingly globalized economy (Zhu et al., 2020). In this paper, our focus is on how digitalization transforms the operations of small- and medium-sized firms in its broadest sense.

Keywords

Digitalization, SMEs, communication, Internet-based business

Introduction

There is considerable current research interest in how the Internet and related technologies enable smaller firms to internationalize. Many researchers posit that such technologies offer unprecedented opportunities for such firms to overcome geographic barriers to expand into foreign markets (Hamill, 1997, Hamill and Gregory, 1997, Poon and Jevons, 1997, Samiee, 1998a, Samiee, 1998b). Indeed, the argument that smaller firms can particularly benefit from gathering information and promoting themselves and service customers in new markets for relatively little expense is very persuasive (Chattell, 2016, Franson and DeSmith, 2005, Klein and Quelch, 1997). Many authors also contend that due to the impact of the Internet, and the World Wide Web (WWW) in particular, firms will experience fewer barriers to internationalization. Thus, they will be able to market globally at an early stage of development (Bennett, 1997, Berry and Brock, 2004, Kuemmerle, 2002, Mostafa et al., 2005).

Therefore, it might be postulated that due to their high skill level, Internet startups are in a superior position to capitalize on new marketing conditions brought about by the WWW and that the preponderance of such firms is, therefore, ‘global from inception. However, the internationalization of Internet-enabled companies is by no means a deterministic or even a homogeneous process. Internationalization pathways reflect different strategies that relate market scope to timing advantages to lever value from the business model. Moreover, any decision to pursue an international strategy is not solely dependent on the availability and adoption of such technologies. Instead, it is also influenced by many other factors, such as the international orientation of management, product/service characteristics, the availability of human and financial resources, the existence of networks, and the firm's ability to leverage external resources.

What is digitalization?

Digitalization of all types of business activities allows even the smallest firm to be active globally through local and global networks (Michael, 2018, Neubert, 2017, Brieger et al., 2022). The use of digital tools is often seen as crucial for global startups (Tanev et al., 2015, Rasmussen and Tanev, 2015) as they need access to global markets and market information from the founding of the firm.

Deng et al. (2022) state that "advanced digital infrastructure in both home and destination markets reduces the transaction cost associated with information acquisition and processing, enabling the exporter to be more efficient and effective in responding to challenges in new foreign markets and in organizational learning." In line with Brieger et al. (2022), this argumentation can be reversed, meaning that a highly efficient local digital infrastructure can make it easier for new ventures to find

local customers. This discussion is, in our opinion, too simplified, and there is a need for a clarification of the concepts related to digitalization.

Digitalization is transforming the value creation of almost all firms globally and affects all aspects of business and society (Autio et al., 2021). Similar to the introduction of the steam engine and electricity digitalization transcends all business activities and cannot be seen as something you add to the existing activities of a firm. Digitalization is considerably broad in doing all activities digital; however, it is essential to remember that firms are digital and across national borders to create a resilient business. Zwass (2003) pioneered the first comprehensive digital business definition, *"…the sharing of business information, maintaining business relationships and conducting business transactions through telecommunication networks".* E-Business and e-Commerce were first mentioned in academic literature during the late 1980s to differentiate between traditional, paper-based (analog) transactions and electronically (digital) conducted exchanges. Timmers (2000) posits that a 'true' Digital Business should encompass all electronic trading and service steps, such as online marketing, ordering, remittance facilities and complaints, returns, and after-sale support. We use a more comprehensive definition of digital business, including buying and selling on the Internet, supporting/servicing customers, and collaborating with various business partners across national borders.

Autio (2017) offers a simple definition of digitalization as digital technologies and infrastructures that impact businesses and society. It is evident that digitalization has changed the life of many SMEs through business operations, management, production, sourcing, and sales. New business models have been formed from the digitalization of all the business activities of an SME (Khare et al., 2022). Communication to customers, clients, and other stakeholders is done on a day-to-day basis globally, leading to new opportunities and problems in the global supply chains.

From an entrepreneurial perspective, digitalization makes entrepreneurs more flexible, meaning they can do business at home and abroad. The use of the Internet and digital platforms enable new ventures to break local and national institutional boundaries and to operate in new markets and niches (Brieger et al., 2022). As Ulhøi (2021) states, the use of digital tools in entrepreneurial firms affects all types of activities in the firm and not just sales and marketing. Digital technologies have increased entrepreneurial processes' dynamics and reduced the importance of organizational boundaries and locational advantages. On the other hand, digital technologies require skills and competencies to be effective, which not all SMEs have. This could imply that SMEs need to partner with companies with the necessary resources to handle digitalization.

Types of digitalization

Matlay (2004) offers five basic types of digitalization:

1. *Business-to-Business (B2B)* involves the marketing and sales of products/services between businesses.
2. *Business-to-Customer (B2C),* where businesses target products/services directly and exclusively to private customers.
3. *Business-to-Government (B2G)* entails businesses delivering a range of products/services electronically to Government or Government sponsored institutions.
4. *Business-to-Portal (B2P)* involves marketing products/services on an Internet-based portal. This could be foreign a foreign distributors webpage.
5. *Business-to-Affiliate (B2A)* includes marketing an affiliate's products/services on a commercial website.

It is important to stress that a firm can target more segments simultaneously. Also, the evolution of technology and ongoing digitalization have rendered consumers' interchangeable and seamless use of channels possible. Therefore, the lines between different channels become increasingly blurred (Trenz, 2015). Classical brick-and-mortar stores offer the uniqueness of consumers' being able to touch products with immediate satisfaction; however, online channels can lure with more information, price comparisons, and user-generated content such as ratings and reviews (Kim et al., 2002). Thus, producers must adjust their channel management to provide the appropriate channel configuration and customer experience (Brynjolfsson et al., 2013).

Several producers have previously changed their channel strategies towards multichannel retailing, i.e., offering a broad range of direct and/or indirect channels. This strategy has been established as the most effective and dominant approach for many producers (Beck and Rygl, 2015).

The advantage of digitalization

Servais et al. (2006) concluded that E-business is a crucial business tool, and the increasing presence on the Internet reflects this fact. They concluded that born global firms use the Internet to convey their market presence, but only to a limited extent do they sell their products via the Internet. Instead, they use the Internet to support existing relationships. For small- and medium-sized firms (SMEs) interested in internationalizing, the Internet offers some advantages because, with e-business,

borders between countries are becoming less relevant, and more direct interaction between business entities is made possible. The authors also stress the importance of further research on how born global firms embark on the digital transition, as channel expansions were not the result of meticulous planning but were driven by market developments and new consumer demands. However, to fully meet today's international consumer needs for simultaneous channel use and seamless channel switching with uniform brand perception, producers must go one step further to establish this resilience.

The omnichannel strategy represents the vision of the ideal strategy to offer various digital channels regarding the latest developments and match today's consumer behavior. The quest is to establish a portfolio of channels targeted at different international markets based on the blend of online/offline channels and whether these should be of a more transactional nature or more communitive nature. As mentioned above, in times of Covid-19, the challenge to international firms becomes how to become resilient in global markets by building on these digital business models.

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Firm presence in different spaces	**Offline**	**Online**
Information spaces	Brochures, flyers	Webpage
Communication spaces	Trade fairs, Visits	SoMe, Youtube, FAQ,
Transaction spaces	Money, Technician	Extranets – service updates, online Bank
Distribution spaces	Agents, Distributor	Portals, E-business

Figure 1: Offline and online presence

Resilience can enhance the continuous learning cycle among managers, making them more qualified to deal with new challenges that are likely to emerge in the future. As mentioned above, in times of Covid-19, the challenge to international firms becomes how to become resilient in global markets by building on these digital business models. Hence, we will investigate how these firms handle their current challenges and whether they work with their resourcefulness, dynamic competitiveness, and learning and culture. In sum, the knowledge can be disseminated by establishing international digital business models that prepare them for the eventuality of new disruptions and consider ways to act promptly and avoid devastating consequences for their employees and clients (Duarte Alonso et al., 2020).

If we compare to the MNEs during the Corona crisis (Srinivasan and Eden, 2021), it is clear that the firms that thrived during the crisis and led the transformation to digitalization were the 'Born Digitals'. Compared to traditional brick-and-mortar firms, the global value chains of these firms are focused on automation, flexibility, and scalability, all through digitalization. Thus, traditional MNEs have been forced to go digital with a diversification driven by resilience concerns (Srinivasan and Eden, 2021). Advanced digital technology will make MNE's global value chains shorter and more dynamic. Furthermore, the GVCs will be capable of reaching customers and suppliers faster. To obtain this goal, the GVCs will be quicker and more regionalized. As SMEs worldwide are, to a high extent, integrated into the MNEs' value chains, this development will have a significant impact on them, too, and already has had.

Resilience

Resilience is an organization's ability to overcome and survive external threats and, in some cases, strengthen the business model during a crisis (Dias et al., 2022). Resilience can enhance the continuous learning cycle among managers, making them more qualified to deal with new challenges that are likely to emerge in the future. Hence, we will investigate how firms handle their current challenges and whether they work with their resourcefulness, dynamic competitiveness, and learning and culture. Resilience can thus be seen from a personal perspective, but in this paper, it will be used on an organizational level as a key to overcoming external threats within organizations, such as unexpected events and extreme variations that shock organizations.

During the Corona crisis, resilience had to be a critical strategic tool for SMEs (Duarte Alonso et al., 2020) to find alternatives to pre-Corona operations. The solution was often (see Figure 1) to move activities from offline to online, indicating a high amount of digitalization. Periods of external crisis force the SMEs to adapt their business model fast and build new relations and networks, often using digitalization (Fath et al., 2021). From a New Zealand perspective, Fath et al. (2021) demonstrate how small exporters had to digitally develop new methods to communicate with partners during the Corona epidemic. However, this was not an easy task as the firms had to reconfigure their resources and find new partners and opportunities externally.

It was clear that firms with a robust digital infrastructure or could develop it during the crisis showed considerable resilience. Resilience in the SME is thus linked to the ability to reconfigure resources and develop new business models, for example, through digitalization. This was in the firms (Fath et al.,

2021) done through online sales and marketing methods and through the development of communication tools like online videos for customers and partners.
In sum, the knowledge can be disseminated by establishing international digital business models that prepare them for the eventuality of new disruptions and consider ways to act promptly and avoid devastating consequences for their employees and clients).

The role of the Internet on Firm Internationalization

There is widespread agreement that the Internet provides firms with new ways to conduct business and exchange and communicate ideas and information (Weill and Vitale, 2002, Weill and Woerner, 2015). Doing so enables firms to improve their efficiency and develop new ways to coordinate their activities. By its very nature, the Internet is an international communications medium; however, obtaining a web presence is both relatively cheap and straightforward. The Internet is not just the domain of the large MNE, as web access is available to all firms, regardless of size. The exponential advances in communications technologies, mainly the Internet, mean that SMEs may position themselves at the center of the global stage from birth.

Without a doubt, the Internet is strategically significant for smaller firms and may significantly increase their levels of internationalization. It can offer global 24-hour visibility and may provide the basis for intranet or extranet options that used to be exclusively the preserve of larger firms (Benitez-Amado and Walczuch, 2012). It also gives the smaller enterprise a vast international reach, allowing it to disseminate messages to the narrowest niche markets worldwide. Therefore, SMEs can express a web voice as salient as those of the most significant undertakings, and a small firm’s web pages can be as eye-catching as the pages belonging to the large MNE.

According to Bennett (1997), the Internet has the potential to remove the constraints of both distance and time; it can facilitate the instant establishment of virtual branches throughout the world, allowing direct and immediate foreign market entry to the smallest of businesses. (Hamill and Gregory, 1997) and (Hamill, 1997), for example, state that an Internet connection can "substantially improve communications with existing foreign customers, suppliers, agents and distributors, identify new customers and distributors, and generate a wealth of information on market trends and on the latest technology and research and technical developments". The Internet enables small firms to grow without expanding physically or incurring relocation expenses and allows them to advertise and promote themselves globally at minimal cost. Customers care very little about the physical size or remoteness of a supplier, provided high quality products at fair prices are delivered. Such

considerations raise the possibility that the availability of and access to the WWW removes "at a stroke" a number of the organizational and resource constraints supposedly associated with exporting for the smaller firm.

Lefebvre et al. (1998) examined the role of technological capabilities in the internationalization of SMEs, focusing only on R&D-intensive firms. They proposed that because competition is increasingly technology-based, firms' technology capabilities would majorly determine a firm's propensity to export. However, other research into this area has produced conflicting results. Small exporters can thus compete in foreign markets because of their technological capabilities.

Bennett (1997) is an empirical study that asked Internet-enabled exporters to rate its impact on several export marketing variables. Generally, exporters had favorable views of the Internet's contributions. Internet use was regarded as especially valuable for generating sales leads, helping the firm sell in remote countries, penetrate foreign markets, create international awareness of the enterprise, and avoiding bothering with foreign cultures and business practices. These results generally supported the proposition that the use of the Internet provided firms, particularly SMEs, with a low-cost gateway to global markets.

However, it is not always obvious how to secure a strategic advantage by being Internet-enabled. The articles by (Poon and Jevons, 1997, Poon and Swatman, 1997) discuss the geographic coverage of small business markets, identifying those businesses with localized markets that do not benefit from factors such as low-cost communication or widened corporate exposure. From this, it is logical that exporters or international traders have the most to gain from the use of the Internet. But it is not clear from the research undertaken to date how the Internet and allied technologies impact internationalization strategies, as opposed to facilitating the process.

Being digital and global

The cost of doing business globally across nations has decreased rapidly, but the decline has increased due to the digital revolution (Autio et al., 2021). New industries related to this development have developed with new business models. Digital infrastructures make markets and resources (as sub-suppliers) accessible everywhere, changing the global strategy for even the smallest firm. Coordination costs have been lovered for the multinational firms, especially the MNEs (Autio et al., 2021). Global value chains have become digital and expanded to simultaneously include partners in many countries.

Digitalization can be a great opportunity if a small firm has the ability and resources to operate in these global value chains.

As mentioned in Brieger et al. (2022), international entrepreneurs will use the available digital tools to enter markets far away if they experience problems in the home market. Weak digital infrastructure is thus not necessarily a hindrance to a global market expansion. On the other hand, if the resources are not at hand, an SME can easily be left behind in the fast acceleration of digitalization.

Deng et al. (2022) focus on how exporters can use digital platforms and the Internet and thus reduce transaction costs and lead to improved export performance. However, the increased speed of market expansion comes with a price, too, as uncertainty and risk increase. This is especially a problem for a small firm that uses a digital platform to enter many markets simultaneously. This is linked to the lack of learning in SMEs as they enter many markets simultaneously. In principle, an SME can manage information collection more effectively and sustain a more resilient development in the global markets through digitalization. But, as demonstrated by (Deng et al., 2022), rapid internationalization through a digital platform is not always an advantage for a small firm. The use of online tools for rapid global expansion is not a simple solution for the SME and its managers but demands a thorough evaluation of the information obtained through the Internet.

Conclusion

During a global crisis such as the Corona epidemic, digitalization increases its speed and creates many disruptions, especially in the communication area (Autio et al., 2021, Amankwah-Amoah et al., 2021). Covid-19 has been a catalyst for the digitalization of businesses globally and an accelerator that speeds up the current development (Amankwah-Amoah et al., 2021). Digitalization gave rise to new opportunities for the global SME, but also raised concerns about the development, and led to negative feedback loops. For SMEs ready to embrace and use digital technologies, the Corona crisis led to cost reduction, increased efficiency in communication, and new opportunities. The positive effects often led to streamlining processes in the firm and to stakeholders outside the firm, thus improving the firm's competitive position. However, it is essential to notice that many firms experienced the harmful effects of the Corona crisis and could not benefit from an increased speed of digitalization. This is especially true for firms from emerging economies (Amankwah-Amoah et al., 2021).

The crisis led to firms reinventing themselves and their strategies and business models. For firms in industrialized and prosperous countries with advanced digital infrastructure and a high level of

education, adapting to a new digital reality has been troublesome but not impossible. But, when firms lack the necessary digital infrastructure like access to cheap Internet connections and the employees with the skills needed to drive the digital transformation, digitalization becomes a problem and not an opportunity. For these firms, the digitalization of their business will often be seen as something to put on top of the existing activities and not a new perspective that will transcend all activities in the firm. A classic example is a small firm that establishes a simple homepage for the firm and expects this to be the digitalization needed.

Digitalization of business activities has been a 'must 'for all firms, especially during the Corona crisis. However, it can be challenging for an SME to integrate digitalization into all its business. The solution for the small firms has often been to add digitalization to the existing business and not to integrate the digital tools. If digitalization will lead to benefits for the SME, it has to be part of all aspects of its business model.

Getting access to customers through the Internet and communicating with them through digital tools can reduce the cost of expanding globally for the small firm, but it is important to stress that the firm and its managers must be prepared for the development.

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What financial risks do SMEs and service providers face in the service offering?

Multiple Case Study of Finnish Process Industry Companies

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Abstract

The aim of this study was to determine the financial risks involved in servitization, especially in the Finnish micro and small companies located in Northern Ostrobothnia. The study emphasizes the role of advanced services in the process industry. Crediting is considered a growing financing option in process industry, the possibility of potential financial risks gets higher. Large companies usually have more than one financing options, but due to limited resources available to the micro and small companies, it caused the added risk. In order to examine this, a multiple case study was opted to do empirical analysis of four (04) process industry enterprises. To get the in-depth analysis, the research data was collected through four semi-structured interviews with the key executives of the case companies. The findings of this study suggested that the advanced services contributed to the increase in fixed costs as the capital cost of the economy remains burdened by the enterprises through a longer

period of time. Hence, making the cost management as one of the most significant risks. Furthermore, the growing trend of challenges faced by micro-companies was more significant than small companies.

Keywords—Servitization; Advanced Services; Fixed Costs; Accounting; SMEs.

Introduction

Nowadays, customers are looking for convenient options as they have very little time to spare for trivial details. The servitization concept presented in terms of a conscious drive of the company in manufacturing business into the field of services to pick up competitive advantage. These focus primarily on the clients, giving the right combination of items, and provide excellent support, information and self-service (Vandermerwe & Rada, 1988). There are many benefits of the servitization including maximizing customer retention, coming up with creativity in the product, giving competitors a strong competition and high rate of response. Servitization adds extra value to the client in the existing product by the organization (Raddats et al., 2019).

Nowadays, many firms are shifting towards the combined solution to consumer businesses. Like, the most famous furniture company, IKEA, has currently begun to lease furniture to clients and thinks to shift into subscription services in the days to come (Milne, 2019). According to Baines, Lightfoot, Benedettini, and Kay (2009a), shift is because the cost base for manufacturing, manufacturing competition and products made in low-cost economies have driven the manufacturers, that competing against the competition on price alone is no longer viable.

There are three types of services suggested by above examples. 1) Base services are those products that are tangible and can be fostered by SMEs and are not harmful in the long run like different kinds of equipment including spare parts (Belás, 2015). 2) Intermediate services; they provide maintenance and repair of products, for example, technical helpdesk and operator training. To adopt these services, SMEs should take some mini-steps to increase their resources to increase in capital gain. 3) Advance services: “A capability delivered through product performance and often featuring; relationship over extended life-cycle, extended responsibilities and regular revenue payments” (Baines et al., 2013, p.639).

Literature Review

“Advanced services extend the manufacturers operations into those of the customer for a lengthy-term (five, ten, 15 years are typical). This change in organisational positioning and responsibilities means that there are now many more points of contact with the customer than would occur in

conventional manufacture" (Baines et al., 2013, p.639). The literature of servitization has made us aware of the service strategies, realignment of capabilities and resources required by SME to achieve business objectives and decide the prices (Brax & Visintin, 2017). Fang, Palmatier, & Steenkamp (2008), demonstrate, that service revenues are only 20 to 30 per cent of total sales when the effect of servitization is minimal or slightly negative on the firm price, and that its influence is favourable even beyond that limit. Services make a positive contribution to income by offsetting around 20% of total revenues and that services, repeatedly reduce productivity and by up to around 60% of total revenues.

Organization financial risk does not compromise of a single type of risk, but the financial risk is an amalgamation of several risks that comprises of the credit risk, liquidity risk, investment risk, debt risk, functional risk, prepayments risk and systematic risks etc. (Bartram et al., 2011). Furthermore, financial risk can create vulnerable outcome for the small and medium-sized entities including lack of resources and market vulnerability (Zhao & Zeng, 2014). The banks provide financial assistance to the organizations especially SMEs as they find it harder to gather equity finances (Moro & Fink, 2013). The ambiguity in gaining access to finance is significant flaw in terms of the SMEs leading to the existence of enormous challenges. (Berger & Udell., 1998). The liquidity of the organization holds immense significance and also affects the risk level of organization. There is a direct correlation between the cash conversion and the profitability position (Zygmunt, 2013). The liquidity of the SME is significantly influenced by profitability, tangibility, size, and the SMEs firm status (Wasiuzzaman, 2020).

There are certain costs attached to public financing, which cannot be afforded by the SMEs. On the other hand, these costs often result in economies of scale for larger organizations enhancing their cost efficiency due to large business size (Farrell, 2020).

Problem Statement

The crediting condition according to OECD (2019), the report for Finland shows that for SMEs, the interest rate on small loans has increased to 3.9%, which is higher than previous years (2010-2017), it was around 2.5%. This shows credit tightening for SMEs. SMEs are more likely to be exposed to financial risks because they lack financial information and tangible assets as collateral. SMEs and Service providers are facing financial risks in the service offering. However, there is not an issue of this sort, for large companies. (Berger & Udell, 1998)

Research Questions

With this in-depth study, we intend to find out the answers to our queries. The research question for this study is as follows:

1. What financial risks do SMEs and service providers face in the service offering?
2. What are the key challenges, which should be taken into consideration by SMEs in servitization?

Sub-question: How the size of the company affects the severity of these challenges?

Research Objective

Our main objective is to find out the financial risks the SMEs and service providers face in the service offering while operating on the advance service business model. In terms of accounting, when SME credit their assets in their financial statements and losses which is incurred on those assets, it will all be the responsibility of SME. In our research, the goal is to find out the problems which can occur if SMEs and service providers which provide the services on crediting.

Research Methodology

According to the book of "Qualitative research and content analysis" by Tuomi & Sarajärvi (2009), 'Qualitative research method is employed for statement, comprehension and analyses of some specific fact' (p. 87). For this purpose, guided interviews data is taken by Elite sampling with most subject-specific information (Tuomi & Sarajärvi, 2009). Bifurcation of commonalities and differences is the most foreseen thing when it comes studying multiple cases and with differently–dimensioned scenarios, so this research employees multiple case study approaches to see what is provisionally intended for this study (Yin, 2009).

Research Methods

In order to achieve the research objectives and finding answers to the research questions, semi-structured and individual interviews are conducted between April 2017 and October 2017 in the project 'ProcessSME' to get the primary data for this research. In this research, the case selection is done according to their industry, process industry in this particular study, size (micro or small companies) as prescribed by the definition, and location (Northern Ostro-Bothnia, Finland).The data collection is done in Finnish language but for this research it is later converted into English language. We opted to interview the senior executives from the case firms. Nvivo content analysis is used to analyse the data. Cross Case Analysis is employed in this study to gather indication from primary data and coded in comprehensive thematic headings, later summarized with themes and citations.

Table 1 Profile of Respondents

Case Company	Respondent Name	Respondent Designation	Duration	Transcribed text
Case I	Manager W	Managing Director, Case I	01:09:28	17 pages

Case II	Manager X	Managing Director, Case II	01:18:31	19 pages
Case III	Manager Y	Manager Director, Case III	01:16:52	16 pages
Case IV	Manager Z	CEO/ Co-founder, Case IV	01: 11.37	19 pages

Discussion and Analysis

The empirical findings of the study suggest that business model tells a lot about the companies working. The four case companies have no more than 25 employees which puts them in micro and small category, have the potential and goals of expanding their teams. The cost structure of most companies is heavily invested in long sales procedures which in result causes an increase in company's fixed cost. Then there is also a problem of brand development in SMEs to create positive image and increase perceived value (Kohtamäki et al., 2018).

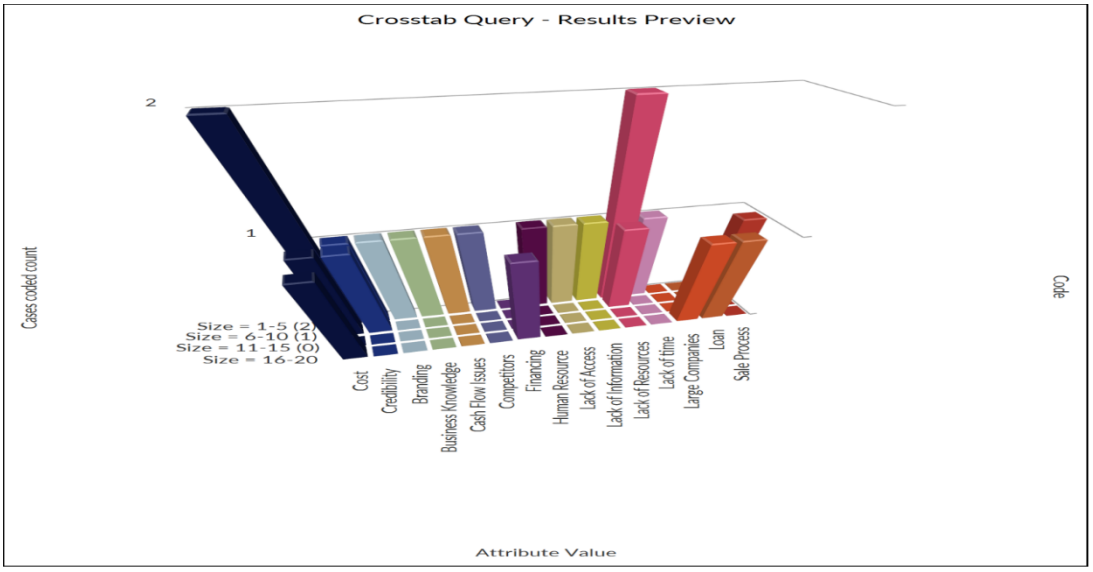
When the SMEs and service provider adopt servitization, we discovered that by enhancing time period of sales, the fixed cost of organizations also increases due to advanced products and novel R&D (Acha et al., 2004; Neely et al., 2011). We concluded that there is difficulty in cash flow as it handle cost structure that effect directly on business profitability (Cornett et al., 2003). Furthermore, Investment in non-current assets leads to cash flow problems, thus leading towards liquidity crisis.

As we previously have determined the firm performance based on the number of employees and turnover, there is a deciding factor that these SMEs are lacking in human resources, wide cash flow and multiple internal funding sources which force them to seek external funding sources and which causes problems with high-risk exposure for the SMEs (Baker & Wurgler, 2006; Kavita, 2018).

Cross-Case Analysis

Cross case analysis, as described in the methodology helps to understand the similarities in cases and also what makes them different from each other. The empirical data and findings when analysed through NVivo, with size being the case attribute, the following crosstab query analysed the trends as shown in graph (figure) below:

Figure 1 Crosstab Query: Cases vs Attribute & Code



It is easy to see that as the size of the firm increases, the number of the challenges decreases. In smaller firms, the number of challenges are larger in number. Financial risk including cost, cash flow issues, financing and credit risk is more evident in micro firms, having number of employees less than 10.

First mentioning the similarities between cases, the findings indicate that issues related to cost and lack of resources has been observed in all the cases. The issue related to increasing in fixed cost is observed in all except for Case II and Case I. Case IV was more concerned about credibility than others and Case III also considered it a challenge. Challenges including branding, business knowledge, competitor issues, human resource and lack of information are observed by Case II. Lack of access and cash flow issues are observed by Case III. Case I experiences financing issue, delays in decision making from large companies and challenges to get loan. Case IV complains about the long sales process.

Conclusion & Implications

The findings suggested that multiple risks such as credit risk and liquidity risk occur for these businesses. Managing cost is found to be one of the biggest challenges in this study as the increase in fixed cost exposed the company to cash flow issues, which causes problems with high-risk exposure for the SMEs- With cross-case analysis, it is found that as the size of the company decreased, the number of challenges increased.

This study has significantly focused on SMEs, which, according to OECD report, constitutes the 99.3 % of all companies operating in Finland. This shows that these research findings will have a significant impact in the financial decision making of SMEs. The importance of liquidity and cash on hand is important in order to operate the business and dealing with other variable costs; therefore, business

model selection in comparison to resources availability should be a feasible option. This can tell about a lot of pre-emptive measures for the entrepreneurs entering into servitization and risk management perspective for the managers.

We cannot generalize this study, as the data collected only included micro and small businesses in Finland (Northern Ostrobothnia), and it does not take the opinion of any external stakeholders, which may or may not have a difference of opinion. Future researchers might overcome the limitations of this study by expanding the sample size of the study and examine other types of financial risks also in medium enterprises and do the comparison of those with large companies. The generalizability of this study to all sorts of service providers is also limited. Furthermore, this study does not provide the answer to what adjustments the SMEs should do to avoid these risks and what changes to apply to their business model.

It is recommended for companies moving towards servitization that they make separate financial statements based on service categorization, the level of services, basic, intermediate, advanced services. So for each category, financial analysis can be performed, and quantitative/concrete evidence can be formed, including financial ratio analysis.

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Developmental evaluation of the Experiential Entrepreneurship Education case in Basic Education 6th Grade and in Higher Education

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Abstract

Our society is looking for solutions to develop citizens' entrepreneurial mindsets, attitudes, skills and behaviours as the number of part-time jobs and forms of self-employment are constantly increasing. One potential solution is to increase the amount of Entrepreneurship Education (EE) in our education system.

It has been said that people are not born entrepreneurs and that entrepreneurship can be understood as a learning process. It is necessary to start supporting entrepreneurship as early as possible in order to influence a student's entrepreneurial mindset, attitude, skills and behaviour. In the EU, entrepreneurial education has been raised as being an essential way to develop an entrepreneurial mindset amongst young people. Studies show that strengthening entrepreneurial mindset and skills create a foundation for entrepreneurial attitude and behaviour. An entrepreneurial attitude is characterized by initiative, proactivity, independence and innovation on a personal, social and professional level. When talking about the development of a student's entrepreneurial mindset in basic education, the teacher's role and the pedagogy in use are at the center of the discussion.

EE has been said to be "any pedagogical programme of education for entrepreneurial attitudes and skills" - it is not a question of whether it can be taught but more of what should be taught and how. It is widely felt by scholars that learning by doing, experiential learning, emulating entrepreneurial experiences and using education to develop the attitudes which are associated with entrepreneurship are pedagogically beneficial and relevant. The relevance of pedagogical 'nudging' as creating challenging learning spaces to promote and support students to be able to learn about themselves as being entrepreneurial, creative and independent thinkers, risk-takers and

responsibility takers, has also been accepted. EE is the way of understanding what entrepreneurship is. How to set up and manage a business is only one part of EE. It is teaching about entrepreneurship, the knowledge and skills necessary to start and manage a business – teaching for entrepreneurship and organizing the entrepreneurial learning process experientially - teaching through entrepreneurship.

In this case study I focus on an experiential entrepreneurship education (EEE) process in a basic education 6th grade (age 11-13) and Higher Education (HEI) in Finland. Students leave their comfort zone, develop their entrepreneurial mindset, abilities to test, articulate ideas, experience and prototype their findings in markets. Students of EEE face uncertainty, ambiguity, dealing with potential or real customers and suppliers and demonstrating proactiveness in exploring and defining entrepreneurial opportunities. EEE focuses on hands-on experiences in contrast to classroom teaching. EEE builds a bridge to future entrepreneurial experiences and increases entrepreneurial self-efficacy by connecting ambiguity in social and professional uncertainties contained in markets and the future.

I use in this case study 'Developmental Evaluation' (DE) method. The idea of DE is to support the innovation (e.g. projects, programs, products, organizational changes, policy reforms or system interventions) development process. DE can include evaluative questions and logic and gathers real time data to inform an ongoing process. The evaluator (in this case study I was as an evaluator) is part of a program design team or management team (in this case study team is called advisory board, AB). AB function in the team is to: lead, support discussions with evaluative questions, reflect, monitor data, and facilitate systematic data-based reflection and decision making within the DE. AB participate in deciding and facilitating discussions about how to evaluate and what is happening. All team members interpret evaluation findings, analyze implications and apply results to the next stage of development. They become involved in improving interventions and helping to make the program's future development activity.

The EEE process, which I was evaluate, was called case 'MiniMikkeli' (later the case MiniMikkeli). It is the EEE process for basic education teaching in grade 6 and HEI education. It is part of the basic education grade 6 curriculum as well part of HEI education studies. I collected data using the developmental evaluation case study and I used questionnaires (via webropol) and semi-structured interviews (via teams), as well as observations throughout the EEE process. The study covers years 2016, 2017, 2018 and 2019. The research target group consisted of 109 grade 6 teachers, but only 90 active e-mail addresses. The number of respondents to the questionnaire (via webropol) was confined to only 23 responses. Unfortunately, it is difficult to carry out persuasive quantitative

analysis with such a small number. As a result, the main research data I relied upon is observations and semi-structured interviews. I conducted a total of 8 interviews. The interviewees were grade 6 basic education teachers (N=90), members of case MiniMikkeli advisory board (AB) (they were EE experts, City of Mikkeli basic education director and manager, case MiniMikkeli partners and HEI representatives) (N=6) and higher education students (who participated in Case MiniMikkeli and acted as guides, advisors and business idea evaluators for the grade 6 students.) Observation took place as well at the AB meetings as before, during and after the case MiniMikkeli.

My contribution of this research is to present new perspectives and solutions on how to develop and evaluate experiential entrepreneurship education process in basic education 6th grade and higher education, so it is possible effect on students' entrepreneurial mindsets, attitudes and skills in order to influence entrepreneurial behaviour, entrepreneurship and self-employability. The framework of the study is built around Entrepreneurial Behaviours, Attributes and Skills. The main research questions are:

- How has the case MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education in respondents' opinion?
- Is included in the case MiniMikkeli experiential entrepreneurship education both in basic education 6th grade and higher education (so that in long term the teaching influences students' entrepreneurial behaviours, attributes and skills as well mindsets and attitude)?

In addition, I wanted to understand and try to find answers to the questions:

- How, Entrepreneurship Skills and Competencies, have developed with the case MiniMikkeli?
- How the attributes associated with entrepreneurship changed with the case MiniMikkeli?
- Has the case MiniMikkeli influenced on Entrepreneurial behaviour?

The sub-questions were:

- What entrepreneurship is?
- What entrepreneurship education is?

The paper is made up of introduction and four sections. The introduction, literature review, the methodology of the developmental evaluation in the experiential entrepreneurship education case MiniMikkeli, the results of the study and at the end the summary and recommendations for the future study.

Key words: Developmental Evaluation, Experiential Entrepreneurship Education, Basic Education, Higher Education, Case Study

Introduction

Entrepreneurship and entrepreneurship education (EE) have been discussed to a great extent in the literature in recent years. The results and views differ on whether EE has positive effects (e.g., Souitaris & all., 2007; Ndou & all., 2018) or any effect at all (e.g., Oosterbeek & all., 2010) on the mindsets, attitudes, skills and behaviours on young people to become entrepreneurs. Some have even found mixed results (e.g., Kassen & all., 2015; Barba-Sanchez & all., 2018). Limited research has been done on the context of Finnish EE evaluation. The role of the development of entrepreneurial mindsets, skills, attitudes and behaviours is also rather unclear, especially among basic education. The benefits of increasing the amount of entrepreneurship and EE are usually recognized (Studdard & all., 2013; Ceptureanu, 2015). However, is EE really effected/influenced and what types of benefits have been seen?

Our society is looking for solutions to develop citizens entrepreneurial mindset, attitude, skills and behaviour (Gibb, 1993, 1996, 2012; Henderson & all., 2000; Ajzen & all. 2005; Krueger, 2007; Pittaway & all., 2007; Hofstede & all., 2010; Nabi & all., 2017; Verzat & all., 2017 p. 975-1013; Ndou & all., 2018) because the amount of part-time job is increasing as well, self-employment is constantly increasing (Kauhanen, 2008; Tilev, 2012; Ojala & all., 2016; Larja & all., 2019). One potential solution is to increase Entrepreneurship Education (Krueger, 2007; *Boon & all., 2013;* Bisanz & all., 2019 *p. 143, Kyrö, 2018 in Fayolle (ed.); Rajagopal 2021, p. 4;*) in our education system (Appendix 1.). Ministry of Education and Culture, Finland produced *the Education Entrepreneurship Guidelines* (2017). These guidelines are the directions and coaches measurements for promotion of entrepreneurship and EE at different levels of education.

It is commonly accepted - on the one hand that people are not born entrepreneurs, entrepreneurship can be understood as a learning process (Gartner, 1989; Krueger & all, 2005) and on the other, it is necessary to start to support entrepreneurship as soon as possible (Hofstede & all., 2010; Nielsen & all., 2012; Lackeus 2015; Lackeus & all., 2015; Lindner, 2018; Bisanz & all., 2019, Neergaard & all., 2021) in order to influence entrepreneurial mindsets, attitudes, skills and behaviours. EE bas been seen in the EU an essential way of developing entrepreneurial mindsets among young people (European Commission, 2009; 2011). Studies show that strengthening entrepreneurial mindset and skills creates the foundation for an entrepreneurial attitude and

attitudes towards behaviour regarding entrepreneurship. (Ajzen & all., 2005). Entrepreneurial attitude is characterized by initiative, proactivity, independence and innovation, personally, socially, and professionally (European Commission, 2011). When talking about the development of student's entrepreneurial mindsets, skills, attitudes and behaviours in basic education, the teachers' role and the pedagogy they used is central to the discussion (Neergaard & all., 2021). A widely accepted point is that EE can be seen and understood as educating, teaching about, for and through entrepreneurship (Jamieson, 1984; O'Connor, 2013). EE is not only how to become an independent business owner (Gibb, 1993, 1996, 2012) it is much more. EE is the way of understanding what entrepreneurship is: how to set up and manage a business – teaching about entrepreneurship, the knowledge and skills necessary to start and manage a business – teaching for entrepreneurship and organizing an entrepreneurial learning process experientially - teaching through entrepreneurship (Lackeus, 2015; Lackeus & all., 2015; Komarkova & all., 2015). The process of EE can be seen as a process "about", "for" and "through" entrepreneurship. "About" refers to a content-laden and theoretical approach also known as didactic which is commonly practiced in many educational institutions. "For" methodology aims to instill in students the required entrepreneurial knowledge and skills by way of performing tasks, activities, and projects while "Through" is an experiential learning approach which enables students to obtain hands-on experience in entrepreneurial activities (Lackéus, 2015).

Entrepreneurship education has been referred to as *"any pedagogical programme or process of education for entrepreneurial attitudes and skills"* by Fayolle & all. (2006, 702) and by Kuratko (2005), it is not a question of whether entrepreneurship can be taught but what should be taught and how (Honig, 2004; Fiet, 2001). Influencing entrepreneurial mindset, skills, attitude and behaviour is widely opened by scholars that learning by doing, experiential learning, emulating entrepreneurial experiences and to use education to develop the attitudes which associated with entrepreneurship *are accepted and relevant. (Jamieson, 1984; Kolb 1984; Gibb 1987, 2002;* Minniti & all., 2001; *Hytti & all., 2004; Kyrö, 2005; Hannon, 2006; Löbler, 2006;* Kleiman, 2008; Baron & all., 2010; *Jones & all., 2010; Seikkula-Leino, 2011; Pepin, 2012; Rosendahl & all., 2012; Jones & all., 2012; Middleton, 2013;* Rosendahl & all., 2014; *Moberg, 2014; Donnellon & all., 2014;* Hassi, 2016; Mandel & all., 2016; *Nielsen & all., 2017*; Bisanz & all., 2019; Lindren 2018; Liguori & all., 2019*).* The relevancy of pedagogical nudging has also been noted (Neergaard & all., 2021) as creating and challenging learning spaces promote and support students to learn about themselves as being entrepreneurial, *becoming creative and independent thinkers, risk-takers, assuming responsibility, and valuing diversity, to the development of behaviours, skills and attributes better adapted to the entrepreneurial "way of life" (Gibb 2012),* develop students' entrepreneurial competencies (Bisanz &

all., 2019*)*, identity work (Nielsen & all. 2012) and *encouraging students to put their identity "at risk", strength* self-efficacy and an entrepreneurial mindset with becoming entrepreneurial – when, how, why – little by little (*Henderson & all., 2000; Huber et al., 2014;* Lackeus 2015; Lackeus & all., 2015; *Ndou & all., 2018;* Neergaard & all., 2021).

In this case study I focus on the experiential entrepreneurship education (EEE) discussion in basic education 6th grade (age 11-12) and higher education (HEI) in Finland. At the center of the discussion on EEE is *the process.* Students must leave their comfort zone and develop their entrepreneurial mindset and entrepreneurial abilities, to test and articulate potential ideas, and to experience and prototype their findings in markets. Students, participants of EEE, are facing uncertainty and ambiguity, dealing with the social complexity of interacting with potential or real customers and suppliers, demonstrating proactiveness in exploring and defining entrepreneurial opportunities. EEE focuses on hands-on experiences in contrast to classroom teaching. It is important to imagine or anticipate scenarios. EEE builds a bridge to future entrepreneurial experiences and increases entrepreneurial self-efficacy. Learning from entrepreneurial opportunities, facing ambiguity in social and professional uncertainties in the market/future are relevant approaches in experiential entrepreneurship education. (Mandel & all., 2016)

The research method, I use, was the developmental evaluation of a case study (Patton 1994, 317; 2011, 1; Mathison 2005, 116). The idea of developmental evaluation is used to support innovation e.g. projects, programs, products, organizational changes, policy reforms or system interventions within the developmental process. It is possible to see how developmental evaluation supports to develop the intervention or program, social innovation and adaptive management when informed by systems thinking and sensitive to complex nonlinear dynamics. Evaluation processes can include evaluative questions, apply evaluation logic, and gather real time data to inform ongoing processes. The evaluators are often part of e.g. a program design team or an organization's management team. The evaluator's function in the team is to lead, support team discussions with evaluative questions, think, monitor data, and to facilitate systematic data-based reflection and decision making in the developmental process. They participate fully in making decisions and facilitating discussion about how to evaluate whatever happens. All team members, together, interpret evaluation findings, analyze implications, and apply results to the next stage of development. Evaluators become involved in improving the intervention and use evaluative approaches to facilitate ongoing program, project, product, staff, and organizational development. The evaluators help to make e.g. the program's future development activity.

The EEE case from which the developmental evaluation case study data (Eisenhardt & al. 2007; Welch & al. 2011) I collected, is called *MiniMikk*eli (case MiniMikkeli). It is an EEE process for basic education teaching in grade 6 together with the teaching of higher education. The case MiniMikkeli is led by Mikkeli city education and teaching. It is part of the basic education 6th grade curriculum (Curriculum of the Basic Education 6th grade Mikkeli, 2016). In HEI education it is part of voluntary studies or internship. Students can get credit points of case MiniMikkeli work. I collected the developmental evaluation case study data using a questionnaire via webropol with personal link, semi-structured interviews via teams and observations throughout the experiential entrepreneurship education case MiniMikkeli. The case study covers the years 2016, 2017, 2018 and 2019 EEE cases. Number of respondents to the questionnaire was quite small, only 23. Unfortunately, it is rather difficult to carry out quantitative analysis with such a small number of respondents, that is why the main research data in this case study is observations and semi-structured interviews. I received a total of 8 interviews. The target groups of the case study were: a. 6th grade teachers (N=109, final N=90), b. Case MiniMikkeli advisory board (N=6) and c. higher education students (N=8) who coach both teachers and pupils in the 6th grade during the case.

My contribution to this article is to present new perspectives and solutions on how to develop and evaluate experiential entrepreneurship education process in basic education grade 6 and higher education so that it is possible to effect on students' entrepreneurial behaviours, attributes and skills as well mindsets and attitudes in order to influence long-term entrepreneurial behaviour, entrepreneurship and self-employability. I built the framework of developmental evaluation of this case study around the Entrepreneurial Behaviours, Attributes and Skills by Gibb, 2005 (processed Gustafsson-Pesonen, 2019). My main research questions are: 1. How has the case MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education in respondents' opinion? and 2. Is included in the case MiniMikkeli experiential entrepreneurship education both in basic education 6th grade and higher education (so that in long term the teaching influences students' entrepreneurial behaviours, attributes and skills as well mindsets and attitude)?

In addition, I wanted to understand and try to find answers to the questions: How, Entrepreneurship Skills and Competencies, have developed with the case MiniMikkeli? How the attributes associated with entrepreneurship changed with the case MiniMikkeli? Has the case MiniMikkeli influenced on Entrepreneurial behaviour? As well my sub-questions were: What entrepreneurship is? What entrepreneurship education is?

The paper consists of four sections. A literature review of experiential entrepreneurship education, mindsets, skills, attitudes and behaviours is presented after the introduction. In chapter three, the methodology of developmental evaluation case studies and the experiential entrepreneurship education case MiniMikkeli are described. In chapter four the results of the study are presented. At the end of the paper, there is a summary and recommendations for future study.

Literature review

In this section, I will first go through the EU level premises of EE. Second, I present the Entrepreneurship Education guidelines idea of Ministry of Education and Culture, Finland. Then I will look at some recent and fundamental studies of Entrepreneurial Education (EE). I will go through the Entrepreneurial mindsets, skills, attitudes and behaviours frame, as well Experiential Entrepreneurship Education (EEE) as Entrepreneurial nudging studies which have been published in recent years. The frame focuses on on working life changes and the increasing amount of part-time jobs and self-employment (Kauhanen, 2008; Tilev, 2012; Ojala & all., 2016; Larja & all., 2019) and these changes will be addressed through the development of citizens entrepreneurial mindset, attitude, skills and behaviour (Gibb 1993, 2012; Henderson & all., 2000; Ajzen & all. 2005; Krueger, 2007; Pittaway & all., 2007; Hofstede & all., 2010; Nabi & all., 2017; Verzat & all., 2017 p. 975-1013; Ndou & all., 2018). According to research (Krueger, 2007; *Boon & all., 2013;* Bisanz & all., 2019*, Kyrö, 2018 in Fayolle (ed.), 164–186; Rajagopal & all. (ed) 2021, p. 4;*) increasing EE in the education system (Appendix 1.) is a relevant way to support these changes. This case study seeks to highlight Experiential Entrepreneurship Education *(Jamieson, 1984; Kolb 1984, Gibb 1987, 2002;* Minniti & all., 2001; *Hytti & all., 2004; Kyrö, 2005; Hannon, 2006; Löbler, 2006;* Kleiman, 2008; Baron & all., 2010; *Jones & all., 2010; Seikkula-Leino, 2011; Pepin, 2012; Rosendahl & all., 2012; Jones & all., 2012; Middleton, 2013;* Rosendhal & all., 2014; *Moberg, 2014; Donnellon & all., 2014; Gautam & all., 2015;* Hassi, 2016; Mandel & all., 2016; *Nielsen & all. 2017*; Bisanz & all., 2019; Lindner 2018; Liguori & all., 2019*).* The relevancy of pedagogical nudging has, as well, been noticed (as/to be) a way of creating a challenging learning space which promotes and supports students to learn about themselves as being entrepreneurial, creative and independent thinkers and risk-takers. It also helps them to learn to assume responsibility, value diversity, develop behaviours, skills and attributes to better adapt to an entrepreneurial "way of life". In addition, it has been seen to encourage students to develop entrepreneurial competencies, to put their identity "at risk", to strengthen self-efficacy and slowly develop an entrepreneurial mindset by becoming more entrepreneurial – when, how, why. (Gibb

2012; Bisanz & all., 2019, 143; Nielsen & all., 2012; *Henderson & all., 2000; Huber et al., 2014;* Lackeus 2015; Lackeus & all. 2015; *Ndou et al., 2018;* Neergaard & all., 2021).

European Union level premises for developing entrepreneurial education

Recent studies have argued that part-time jobs are increasing today and, in the future not only in the EU but, in the Finnish labor market as well (Kauhanen, 2008; Ojala & all, 2016; Larja & all., 2019). In addition, researchers are interested in how voluntary or attractive part-time jobs really are (Tilev, 2012). Constant changes in the labor market mean that e.g. attitudes toward employment and work must begin to change. Studies show that strengthening entrepreneurial mindset creates a basement for entrepreneurial attitude and attitudes related to behaviour regarding entrepreneurship. At the European Union level, EE is an important way of developing entrepreneurial mindsets among young people (European Commission 2013). The EU (European Council 2014) emphasizes the importance of EE, entrepreneurial thinking and acting, mindset, skills and behaviour, and its effect/influence on entrepreneurship. The European Council agrees that both creativity and innovation are very important for corporate development and for the whole of Europe to be competitive in the international market (European Commission, 2009; 2011). It has been written that (European Comission, 2011) entrepreneurial attitude is characterized by initiative, proactivity, independence and innovation, personally, socially and professionally. It also includes determination and motivation for achieving certain objectives, be they personal, social or professional. According to the document of the European Commission, Entrepreneurship Education at school in Europe, in National Strategies, in Curricula and Learning Outcomes, show that those who have had the chance to go through entrepreneurial education are different from those who have not. They have more entrepreneurial attitudes e.g. self-assessment, self-confidence, low uncertainty avoidance, initiative spirit, critical thinking, creativity, imagination in dealing with problems, they have learnt knowledge in the field of entrepreneurship e.g. knowledge about career opportunities, labour market, vocabulary related to the economic literature and they have better entrepreneurial skills: communication, planning, team spirit, proactivity.

The European Council (2014) have argued that the economy and the market need confident and responsible citizens, who take an active role in shaping their own future and the society they live in through entrepreneurial and social initiatives. The European Commission (2016a) is supporting several EE projects to help improve, promote, and assess the impact of entrepreneurship education in Europe. The Commission (2016b) also launched, as part of the New Skills Agenda for Europe, a European entrepreneurship competence framework, EntreComp. The reason was to support and

inspire actions to improve the entrepreneurial capacity of European citizens and organisations. With reference to actions, Krueger (2007) argue that behind entrepreneurial actions there are entrepreneurial intentions, behind the entrepreneurial intentions there are the entrepreneurial attitudes, behind the entrepreneurial attitudes there are strong cognitive structures, and behind the cognitive structures there are strong beliefs. EntreComp focuses on the fact that citizens must have opportunities to be entrepreneurial in any situation: from school curriculum to innovating in the workplace, from community initiatives to applied learning at university. The entrepreneurship competence is thus, recognized as a competence for life, relevant to personal development and fulfilment, finding and progressing in employment, as well as initiating new ventures ranging from community campaigns, social enterprises to new start-up businesses. The fact is, the competences described in EntreComp are not directly linked to founding/running a company, but refer to the entrepreneurial mindset e.g. spotting opportunities, vision, ethical and sustainable thinking, valuing ideas, motivation and perseverance, mobilising resources, learning through experience, planning and management. Drucker (1986), Shane & all. (2000) and Spinelli & all. (2008) believe that at the core of EE research are the competences and that the main idea is that the use of a business opportunity is a central entrepreneurial task. They argue entrepreneurs play a relevant role in all subsystems of our society: from business, religion, sciences and politics to education and sports.

The terms intrapreneurs and co-entrepreneurs, (Wunderer, 2001) which describe entrepreneurs who are not self-employed, but decide to become active within a company, have been added to in the discussion. In addition, the terms social entrepreneurs or change-makers (Drayton, 2003) individuals who combine entrepreneurial and social initiatives to bring about a positive change in society, have been included. Previously, according to The European Commission (2005), entrepreneurship competence was the individual's ability to implement ideas which require creativity, innovation and the willingness to take risks as well as the capacity to plan and implement projects in order to reach certain objectives. It enhances the individual's everyday personal and social life and enables employees to consciously perceive their working environment and grasp opportunities. It is the basis on which entrepreneurs build their initiatives in a social or business context.

Ministry of Education and Culture, Finland (2017) has produced and published Education Entrepreneurship Guidelines. The purpose of these guidelines is to direct, develop and coach measures for the promotion of entrepreneurship and entrepreneurship education at different levels of education. The guidelines serve as a concrete aid to the evaluation and development of activities for school management, staff and other actors in entrepreneurship education, and provide tips and planning support for practical work. The target groups for the Entrepreneurship Guidelines are

varied, including education, training and education actors at all levels of education, education providers and developers, local, regional and national education decision-makers, and entrepreneurs and organizations supporting entrepreneurship. The Entrepreneurship Guidelines form a whole together with parallel guiding strategic documents - such as the government program, provincial, supranational, regional and local entrepreneurship education strategies. The Entrepreneurship Guidelines have been drawn up on the basis of the strategic documents described above, drawing on key EU documents and previous studies and research in collaboration with an extensive working group.

Some recent and fundamental studies about Entrepreneurial Education (EE)

The growth of entrepreneurship in education has increased the EE research. Scholars have investigated EE across a wide variety of populations, including children (Athayde, 2009; Dwerryhouse, 2001), graduate students (Nabi & all., 2006), women (Wilson & all., 2007) veterans (Collins & all., 2014) and to studying EE across a wide array of geographies (Ibrahim & all., 2002; Jesselyn Co & all., 2006; Hytti & all., 2004). Could be seen, the dominant body of EE research has revolved around EE at the four-year university level (e.g. Kuratko, 2005; Solomon & all., 2008; Vanevenhoven & all., 2013). One neglected population is basic education (primary) schools, where entrepreneurship is increasingly being integrated, aiming to get an early start in the development of students' entrepreneurial skills. Pioneering work has been conducted in the UK (Jamieson, 1984; Gibb, 1996; Deuchar, 2004), in the Nordic countries (Johannisson 1991; Erkkilä, 2000; Hytti, 2002) and on policy level by the OECD (2009). Common practical entrepreneurial activities include creation of mini-companies, idea generation exercises, project work, challenges and collaboration with the surrounding community (Eurydice, 2016; Sagar, 2013; Moberg, 2014; Young, 2014). The literature is muddled, in regard to what constitutes entrepreneurship in basic education (primary) school, what effects it can have, why it is deemed desirable, how to do it successfully and even how to label it (Lackéus, 2015).

A key development of entrepreneurial pedagogy was initiated in the 1980s by Allan Gibb and his colleagues at Durham University's Small Business Centre. Gibb (1987) argued for a broader approach to entrepreneurship in education termed "enterprise education." This approach is similar to progressive (or constructivist) pedagogical principles such as action-based, self-directed, team-based and socially situated experiential learning (Kyrö, 2005; Löbler, 2006; Pepin, 2012). Enterprise education was claimed to have been liberated from a limiting business context, deemed to be the main problem behind numerous failed attempts to mainstream entrepreneurship in education (Gibb,

2002). Gibb's broadening of entrepreneurial pedagogy toward entrepreneurial individuals creating value in all walks of life has inspired many other key contributions of relevance in Europe and Australia (Hytti & all., 2004; Hannon, 2006; Jones & all., 2010; Jones & all., 2012; Rosendahl & all., 2012; Moberg, 2014). Most US-based scholars have chosen to keep a narrower business-oriented focus on venture creation as the key defining characteristic of entrepreneurship in education. One argument to put forward is that a focus must remain, in order for, the field not to be diluted into progressive education (Neck, 2018).

EE can be analyzed as educating about, for and through entrepreneurship (Jamieson, 1984). Trying to give understanding to what entrepreneurship is, how to set up and manage business reflects categorically on teaching about entrepreneurship, aiming at giving the requisite knowledge and skills necessary to start and manage business – category of teaching for entrepreneurship, organizing entrepreneurial learning process experientially – category of teaching through entrepreneurship (Lackeus, 2015; Lackeus & all., 2015; Komarkova & all., 2015). Each of these categories can be analyzed independently. Again, all these categories are highly interconnected, especially teaching for and through entrepreneurship when knowledge and skills can be obtained teaching experientially. EE is the process of professional application of knowledge, attitude, skills, and competencies, it is not just teaching how to become an independent business owner, it is much more – EE encompasses creating and nurturing a learning environment that promotes entrepreneurial traits and behaviours, such as becoming a creative and independent thinker, a risk-taker, assuming responsibility, and valuing diversity (Gautam & all., 2015). According to Gibb (2000), EE needs to move away from emphasis on functional subject matter to the development of behaviours, skills and attributes better adapted to the entrepreneurial "way of life".

EE creates a massive impact on individuals' behaviour, enhance employment opportunities, and foster regional economic growth, argue Lackéus & all. (2015). Entrepreneurship readiness can help individuals for their better career opportunities (Johnsen & all., 2005; Lee & all., 2008; Cooper & all., 2008; Cope 2005). According to Lau & all. (2012), entrepreneurship readiness is an individual's capability and inclination to foster entrepreneurial initiatives. According to Fueglistaller (2004) the term "entrepreneur" refers to a person and "entrepreneurship" describes the process of developing an idea, identifying business opportunities and implementing the idea together. It has been said people are not born entrepreneurs they are made entrepreneurs (Gartner, 1989). In addition, Lindner (2018) refer to Faltin (2015) and argue anybody can become active as an entrepreneur. So, if an entrepreneur is made not born, entrepreneurship can be understood as a learning process. Because of this, a theory of entrepreneurship requires a teaching-learning theory (Baron & all., 2010; Minniti & all., 2001) based on that it is possible to use education to develop the attitudes most

associated with entrepreneurship (Kleiman, 2008; Jones & all., 2010). Shane & all., (2000) underline three questions of entrepreneurship: why, when and how opportunities for the creation of goods and services come into existence; why, when and how some people and not others discover and exploit these opportunities; and why, when and how different modes of action are used to exploit entrepreneurial opportunities.

EE can be seen as "any pedagogical program or process of education for entrepreneurial attitudes and skills" (Fayolle & all., 2006). Therefore, it is good to bring up, that there is a debate of most appropriate pedagogical models for teaching entrepreneurship (Dale, 2001; Neck & all., 2011; Honig, 2004). According to Kuratko (2005) it is not a question of whether entrepreneurship can be taught but what should be taught and how (Honig, 2004; Fiet, 2001). Moreover, the keen interest shown to entrepreneurship education by public agencies and policy-makers enforce a pragmatic but potentially problematic and often uni-dimensional focus on numbers, output and effect. Does entrepreneurship education create more entrepreneurs? While this question certainly is legitimate, singling out this dimension runs the risk of ignoring the many different meanings and purposes that influence and shape actual entrepreneurship education activities (Blenker & all., 2014).

Gibb (1993) started discussion on the model of enterprising learning and distinguished EE from traditional education by stating that it is more oriented towards the actions of students and practical tasks. Students should be guided towards certain behaviour through projects, and the teacher is only helping when needed and allowing students to learn in their own various ways. Indeed, instead of theory, learning entrepreneurship should focus on more practical approaches (Gibb,1993; Holmgren & all., 2004; Kassen & all., 2015; Wardana & all., 2020). EE can combine different subjects and it includes, for instance, business-related topics such as marketing (Studdard & all., 2013). When it comes to the purposes and objectives of EE, many are mentioned but few stand out as important. The most prominent is introduce entrepreneurship to young people (Gibb, 1993, 1996; Kassen & all., 2015; Papagiannis, 2018). EE could be seen, as the first step into entrepreneurship and to the development of entrepreneurial qualities and behaviour (Gibb, 1993, 1996), skills (Gibb, 1993, 1996; Papagiannis, 2018) and mindset (Papagiannis, 2018) by giving young people real life practice (Wardana & all., 2020). Some differences of opinion emerge regarding the issue of young people choosing their employment. Kassen & all. (2015) and Barba-Sanchez & all. (2018) suggest that EE encourages young people into choosing entrepreneurship, whereas von Graevenitz & all. (2010) provide an interesting but contradicting point of view on the matter. They proposed that the objective is to show young people which one is a better choice for them in terms of career: self-employment or working for someone else. This way young people would not have to start their own

businesses, if they realize that entrepreneurship is not for them. The variation in purposes and objectives of EE seems to be linked to the different approaches to EE among different schools.

Filion (1994) argue that childhood and adolescence are the ideal time to acquire basic knowledge and foster a positive attitude towards entrepreneurship. It is recommended that the EE process and EE programs should begin early as possible (Do Paco & all., 2011). Landström & all. (2000) state - children could be seen, as entrepreneurial from birth that is the reason, why EE should begin at the youngest age possible. Lindner (2018) point out that all our future entrepreneurs are in school today and in school the nature of students' value-oriented education and their willingness to participate in society is shaped by todays' learning. Shane & all., (2000) present that it is necessary to open the ways in which the business possibility could be seen, while Seikkula-Leino (2011) brought up the need to increase ability to EE. It is also pointed out in studies that even though one would not become self-employed, the entrepreneurial qualities cultivated by EE would be beneficial by the individual working in a dynamic work environment (Henderson & all., 2000; Kuratko, 2005; Studdard & all., 2013; Ceptureanu, 2015; Cardoso & all., 2018). Societal benefits of EE are noted, although they are mostly indirect. One of the most relevant reasons, teaching entrepreneurship is to increase the probability of young people starting their own businesses (Cardoso & all., 2018). This comes about as a result of the economy (Barba-Sanchez & all., 2018) and the need to create one's own well-being (Davidsson, 2015). When the amount of entrepreneurship increases, the unemployment rate will decrease (Kuratko, 2005; Papagiannis, 2018) especially among young people (Ceptureanu, 2015; Cardoso & all., 2018).

Kumar & all. (2021) in Rajagopal & all. ed. argue that entrepreneurship courses develop creative thinking, innovation and make students aware that entrepreneurship is/can be a new employment opportunity. They say EE prevents students from unexpected failures during an entrepreneurial career and argue entrepreneurship readiness is an individual's ability and inclination to initiate an entrepreneurial task and the individual's entrepreneurship readiness is dependent on their opinion on three main factors which are "command on a business idea, support, and encouragement to initiate new venture and source of finance for business". Kumar & all. (2021) in Rajagopal & all. ed. refers to Kourilsky & all (1997 a; b) who argued that entrepreneurship readiness nurtures individuals by enhancing their abilities for entrepreneurial opportunity recognition. EE programs work as a catalyst to enhance the individual's readiness level for entrepreneurship (Staniewski & all., 2015; Kourilsky & all., 1997 a; b). The studies highlight that EE should focus on enhancing entrepreneurship readiness among individuals (de Clercq & all., 2013).

At the end EE is concerned with learning for entrepreneurship, learning through entrepreneurship and learning about entrepreneurship (e.g. Jamieson 1984, Gibb, 2005). EE contributes to modifying individual perceptions of entrepreneurial activity and of personal entrepreneurial abilities. EE was earlier meant to teach individuals how to start a business. Nowadays it is trying to modify personal attitudes so that it makes it easier to enter an entrepreneurial global environment. EE is stimulating entrepreneurship because: individuals learn to be independent, autonomous, self-confident; individuals are made aware of alternative career choices; individuals are better equipped to perceive opportunities; individuals gather information they can use to develop new entrepreneurial opportunities (Verheul & all., 2002, 57).

The Entrepreneurial mindsets, skills, attitudes and behaviours frame

Already in 1911 Schumpeter (2008) argued “entrepreneurs are the key drivers of economic and social dynamics”. He underlined entrepreneurs’ skills and abilities in the independent development, implementation of ideas and pointed out their innovative power, which encompasses the creation of new products, production processes, organizational structures or alternative distribution channels. Since 1990’ Gibb (1993, 2012) argue *entrepreneurial skills*, are not personality features, but characteristics which can be built and developed through experience.

Huber & all. (2012) analyzed a large number of students and brought up the idea that entrepreneurial skills are best developed at an early age. Investments in cognitive skills are relatively more important during the pre-school years, whereas the school years play an important role in the development of non-cognitive skills (Pfeier & all., 2008). Lepoutre & all. (2010) analyzed whether EE programs have a positive effect on entrepreneurship, creativity and attitudes towards entrepreneurs with a sample of teenage pupils and noticed programs have a different effect on teenagers' experience of entrepreneurship-like situations. If at school students learn important life skills, they are more likely to strive towards their ambitions and not be passive when seeking employment (Seikkula-Leino, 2011). If life skills are better, students are better at managing risks associated with those behaviours which are related to an entrepreneur (Kuratko, 2005) and to be able to see business possibilities (Shane & all., 2000; Shane & all., 2001; Kuratko, 2005). Shane (2003, 10) continue that an entrepreneurial process ‘begins with the perception of the existence of opportunities, or situations in which resources can be recombined at a potential profit’. After identifying entrepreneurial opportunities and forming attitudes towards opportunities, it possible to decide whether to exploit the opportunities found. Having a positive attitude towards entrepreneurship is essential in building entrepreneurial intentions and adopting entrepreneurial behaviour. Attitude is seen as a social component, part of the national culture, it is built early in life,

it is "programmed", resulting in patterns of behaviour consonant with the national culture and lasting for a long period of time (Hofstede & all., 2010).

When talking about the education system both formal and nonformal education's purpose is to modify the mindsets, to give birth to the desire to see opportunities, because individuals change the future of society by firstly changing their own view of the role they have in that society. Both formal and nonformal education are needed because, in entrepreneurship, formal education focuses on the cognitive part of the activity, while nonformal education focuses more on the attitudinal and behavioural components. (Rusu, 2015).

The Theory of Planned Behaviour (TPB) Ajzen (1991) is widely understood as the foundation of starting a business and entrepreneurship. Starting a business, entrepreneurship is an intentional, planned behaviour. According to this theory, behaviour can be explained as the result of an intention. Ajzen & all. (2005) argue that attitudes influence behaviour by their impact on intentions and intentions are the best predictor of any planned behaviour, including entrepreneurship. They assume that favourable attitudes predispose positive responses to the object and unfavourable attitudes predispose negative responses. Strong relations between attitudes and behaviour are observed. When motivation and cognitive capacity to carefully process information are high, attitudes do not have to be chronically accessible because they can be effortfully retrieved. Individuals who hold favourable attitudes are likely to notice, attend to, and process primarily the object's positive attributes, whereas individuals with unfavourable attitudes toward the object are likely to direct attention to its negative qualities. If there is no positive attitude towards entrepreneurship there is no entrepreneurial intention, and no entrepreneurial behaviour, as attitude is a determinant of intention, and intention is a determinant of behaviour (Ajzen, 1991). Intention is a function of behavioural beliefs and it is an essential predictor of the subsequent behaviour. By Ajzen intentions are a compilation of attitude, subjective norms and perceived behavioural control and intention is influenced by these three global concepts: 1. attitude - *how attractive the behaviour is for the individual*, perceived subjective norms - *the perceived social pressure for or against the specific behaviour*, perceived behavioural control - *the individual's perception of the control he has on the specific behaviour*. In the entrepreneurial context, entrepreneurial intention shows the effort that a certain individual will make to behave entrepreneurially. In this context, attitude refers to the extent to which the subject positively or negatively evaluates the idea of being an entrepreneur. The second component: 2. the perceived subjective norms *measures the perceived social pressure in adopting or rejecting entrepreneurial behaviour*. The third component: 3. the perceived behavioural control – *refers to there have not anything to do with the will of the individual which has to decide whether or not to behave*

entrepreneurially. It refers to the subjective perception of the level of control the subject has on the behaviour (Ajzen, 2006). In the entrepreneurship - the better the individual evaluations of the entrepreneurial behaviour, the higher the individual perception of the social support for entrepreneurial behaviour, the greater the confidence in the personal ability to act entrepreneurially, the stronger the intention to adopt entrepreneurial behaviour (Kautonen & all., 2013). When understanding all these, it is important for nonformal EE to develop a positive attitude towards this phenomenon. Before being an economic activity entrepreneurship (own business) there is a way of thinking, and if individuals think and feel positive about entrepreneurship there are more chances of them acting entrepreneurially.

Entrepreneurs/entrepreneurship requires a set of skills, which help to survive and provide competitive advantages in the market. The most prominent skills involve decision-making power, communication and relational capital, strategic thinking, negotiation, persuasion, leadership and entrepreneurial marketing. Entrepreneurs create their business opportunities and sustain them in uncertain environmental conditions and cultural diversity (Luczkiw 2005; Fayolle (ed.) 2018, 127-138). Creative thinking fosters their abilities to develop a novel possible solution to solve the old problems and provides a competitive advantage in uncertainty (Duxbury, 2012). EE and training create more impact on an individual's creativity and skill building. EE provides awareness for potential career possibilities in the entrepreneurship field and develops the learning efficacy among students. EE could be seen as a pedagogical tool to understand the entrepreneurial attitude, enhance entrepreneurial skills and helps in developing the entrepreneurial personality of students (Maritz & all., 2013). Often EE is focused on enhancing the entrepreneurship initiatives (Matlay, 2009), developing entrepreneurial tendency (Van Gelderen & all., 2015) and influencing entrepreneurial behaviour (Davidsson, 2015; Fayolle & all., 2010) which affect entrepreneurial outcomes (Solomon & all., 2008). It has been noticed that suitable pedagogical techniques help individuals to achieve all the above. The researchers have highlighted the role of educator diversity (Jones & all., 2010), entrepreneurial self-efficacy (Solomon & all., 2008), different nature of enterprise (Nekka & all., 2010), educational background, teaching methods and pedagogy, international research (Fayolle & all., 2010) and gender issues, enterprise culture (Rae & all., 2010) and competitive offerings (Morris & all., 2013).

Entrepreneurial readiness represents the individual's perceptions, attitude, and belief towards entrepreneurship. It has been raised the phenomenon of the cognitive and non-cognitive field (Othman & all., 2019). Entrepreneurship readiness can help individuals to see better career opportunities (Johnsen & all., 2005; Lee & all., 2008; Cooper & all., 2008; Cope 2005). Lau & all. (2012) noted that entrepreneurship readiness is an individual's capability and inclination to foster

entrepreneurial initiatives. However, youth have ideas, but some capabilities are limited to convert into a business. They must understand that a successful business highly depends on the individual's readiness to transform the idea into a sustainable business. The low level of available unexploited opportunities highlights the lack of necessary capabilities to run an enterprise (Barringer, 2015), low motivational level (Ekpe & all., 2015) and less exposer to EE (Peterman & all., 2003). Youths require motivation and support from the internal and external environment such as schools, government, industries, family and friends to come with the new entrepreneurial profession. Samsudin & all. (2016) have observed a significant and positive relation of entrepreneurship readiness with motivation and attitudes.

It still needs to be highlighted that EE is a way to develop independent ideas, as well as the skills and abilities needed when implementing these ideas into action, and the impact EE has on the social and pedagogical relevance to society (Braukmann, 2011). However, EE seems to have an effect on entrepreneurial mindset (Z. Solesvik & all., 2013; Handayati & all., 2020; Wardana & all., 2020). Wardana & all. (2020) raise as well that EE seems to influence attitudes positively for both self-efficacy and mindset, but self-efficacy does not have a notable influence on mindset. This could be explained by self-efficacy being linked more to skills, or should it be both mindset and self-efficacy are related to gaining more information. Self-efficacy seems to be somehow linked to attitudes, but it also affects mindset which then reinforces the development of intention towards entrepreneurship more. Mindset is affected by increasing desire towards entrepreneurship alongside opportunities to gain information about entrepreneurship (Handayati & all., 2020). Z. Solesvik & all. (2013) propose that if you want to try and have an impact on students' mindset and intention it is necessary for EE to focus on developing students' abilities and willingness to manage risks. Entrepreneurial mindset is a mix of the thinking and the attitude a person has regarding entrepreneurship. Often, a person with an entrepreneurial mindset thinks broadly, critically and creatively (Nabi & all., 2017, cited in Handayati & all., 2020; Ndou & all., 2018). They are determined, drive for change and have courage to take risks (Henderson & all., 2000; Huber & all., 2014). Entrepreneurial mindset includes believing in one's own capabilities (Ndou & all., 2018), and seeking to identify chances to take advantage of in an entrepreneurial way (Ireland & all., 2003). It is argued by Boyles (2012) and Prabowo (2018) that if person is open minded and curiously looks for new information and answers to questions he or she is intrigued entrepreneurship.

Entrepreneurial skills should be seen as more about what a person can do. A person with entrepreneurial skills has a great ability to solve problems (Oosterbeek & all., 2010; Huber & all., 2014; Prabowo, 2018), get things done and generate new innovations (Boyles, 2012). In case of any obstacles, persons can modify their behaviour to make the situation better (Oosterbeek & all., 2010;

Boyles, 2012). Skills also support so-called soft skills, they are a team player and have the ability to lead others (Boyles, 2012; Prabowo, 2018).

The literature addresses the effects of EE on entrepreneurial skills. Huber & all. (2014) found that EE in basic education (primary) school increases the level of "non-cognitive skills". According to Huber & all., (2014) it is important that students learned different aspects of entrepreneurship, and that they were introduced to real life examples of entrepreneurs in class. Also, working in groups seemed to increase the development of certain skills more than teaching entrepreneurship itself. Huber & all. (2014) stated these kinds of skills are indicative of becoming an entrepreneur. In addition, von Graevenitz & all. (2010) argued that impacting skills in EE makes students more aware of their skills or the lack of them. Oosterbeek & all. (2010) claim EE does not improve students' entrepreneurial skills. They argued, this is due to unproductive teaching in the school. Ndou & all. (2018) propose a framework for EE that has different stages to lead the improvement of entrepreneurial mindset. Handayati & all. (2020) found that if they want to develop an entrepreneurial mindset the students need to develop their skills during their education. They suggest that the development of entrepreneurial skills comes before mindset. Finally, Prabowo (2018) found in interviews, that in EE there seems to be the "balance in knowledge and character development".

The entrepreneurial mindset might be seen as a mind that orients human towards entrepreneurial activities and outcomes. It is possible, to understand at least two dimensions: cognitive (a way of thinking), and conative (a way of acting or responding to situations). Kyrö & all. (2008) point out that conation is subdivided into two parts: motivation and volition. Motivation is composed of internal and external goal-orientation, fear of failure, need for achievement, self-esteem and self-efficacy. Volition includes persistence, the will to learn, endeavour, effort, self-regulation, evaluation and control strategies. Isolating the conative dimension is necessary in order to distinguish it from emotions and cognitions.

Kiran & all. (2021) in Rajagopal (ed.), entrepreneurial behaviour, attitude, motivation, and intentions are the buzzwords in today's EE. Moving from trait models to situational models and then to intention-based models of entrepreneurship, there has been a constant focus on identifying the shape of entrepreneurial decision. Predicting entrepreneurial activities by modeling only situational or personal factors offered little explanatory power and smaller predictive validity. Why people demonstrate entrepreneurial behaviour and what effect on their decision to become entrepreneurs is still a question. There is extensive literature highlighting intentions as best predictor of planned behaviour. Entrepreneurship is a type of planned behaviour (Bird, 1988; Katz & all., 1988) for which intention models are obviously best suited. But is there still a need for studies on Entrepreneurial

Behaviour and Attitude and Entrepreneurial Framework Conditions (Kiran & all., 2021 in Rajagopal (ed.).

About Experiential Entrepreneurial Education (EEE)

When discussing experiential learning one potential way is to look at Kolb's (1984) see as well, Healey & all. (2000) and Kolb (2013) experiential learning cycle. Experiential learning is described as a cyclical process where individuals move back and forth between opposing modes of reflection vs. action and feeling vs. thinking. Effective learning in this process requires the resolution of conflicts between these two dialectically opposed modes of adaptation to the world, where the learner draws out his or her attitudes, beliefs and ideas about a topic so that they can be examined, tested, and integrated with new and more refined ideas (Kolb & all., 2005). In its essence, experiential learning theory conceptualizes effective learning as a process involving both direct action and personal reflection (Schön, 1983; Boud & all., 1985; Cope & all., 2000; Cope, 2005). We should also remember teaching about, for and through entrepreneurship when opening EEE (Jamieson, 1984; O'Connor, 2013; Gibb, 1993, 1996, 2012; Lackeus 2015; Lackeus & all. 2015). There are some overlapping activities between "For" and "Through" approaches. Both methodologies require students to perform tasks and activities to attain competency skills. The main difference is that the "Through" approach allows the actual practice of entrepreneurship to be conducted under "safe" conditions (Truell & all., 1998). Experiential learning emphasizes action/reflection and experience/ abstraction which comprises a learning process that requires active participation. It is not only relevant in the classroom but also in many other areas of learning (Kolb & all., 2011). Through a well-designed experiential learning program, students can apply the knowledge and skills that they have learned to grow professionally, personally and add value to society (Awaysheh & all., 2017). Experiential learning is suitable to be implemented in entrepreneurship modules to enhance students' entrepreneurial mindset and intention (Lindberg & all., 2017; Scheepers & all., 2018). Duval-Couetil & all. (2016) raised that EE is more effective when combined with experiential learning which required students to actively participate and reflect on their experiences. Experiential learning could instill critical thinking skills and positive perceived behavioural control in students. Critique to EEE has been raised by Rae & all. (2010) and Miller & all. (2016). They argue that people did not necessarily change their behaviour with experience and experiential learning did not necessarily guarantee that students would achieve the desired outcome in studies and that modification was required in the experiential learning model. Nooghabi & all. (2011) noticed, several researchers had identified challenges in experiential learning and highlighted the need to further enhance its effectivity.

Besides, learning from experience is regarded to be of great importance for entrepreneurs (Vinig & all., 2007). Neck & all. (2014) underline, that entrepreneurship should have a portfolio of practices, including practices of play, empathy, creation, experimentation and reflection. In experiential EE, the process is the point, students are pushed out of their comfort zone to cultivate an entrepreneurial mindset as well as entrepreneurial abilities. Articulating and testing assumptions, experiencing a creation process, prototyping and experimentation in markets are essential for experiential EE (Mandel & all., 2016). Participants of experiential EE are facing uncertainty and ambiguity, dealing with the social complexity of interacting with potential or real customers and suppliers, demonstrating proactiveness in exploring and defining entrepreneurial opportunities. Experiential EE is based on lived experiences in contrast to taught, imagined or anticipated scenarios (Mandel & all., 2016).

When discussing EEE it is also beneficial to look at Student Direct Learning (SDL) (Nasri & all., 2020) where the importance of creating learning environments that regard the design, implementation and evaluation strategies adopted for EE are underlined. SDL teaching design creates an opportunity for students to choose their own learning goals; their own learning strategies and the activities that enable them to self-regulate the learning process. An SDL approach is opposed to a Teacher-Directed approach (TD hereafter) where teachers design learning objectives and control the whole process down to evaluation. Teachers adopting an SDL approach facilitate choices and help students to carry out work with an optimized degree of guidance. At the end of the learning process, students self-assess their own production and learning rather than relying upon the sole external appreciation provided by the teacher.

The main idea in Entrepreneurial Education is largely an experience-based learning approach (Boon & all., 2013). Entrepreneurship in individuals evolves cognitively with the personal abilities to turn ideas into action and build a contextual business model. It is a pool of practice-led knowledge, innovation, and business vision among the entrepreneurs, which they either inherit or learn among social interactions. Entrepreneurs are innovative and they take the initiative and risks to plan and manage business projects to achieve predetermined goals. Entrepreneurial competencies are learnt from the current position in business or their professional prospects. EE helps in enhancing their competencies and capabilities (Strauti & all., 2018).

According to Neergaard & all. (2021) it is very important to pay attention to how educators meet the students, how the students are guided and how educators take into discussions concepts that students bring with them. She pointed out that it is necessary to create safe and challenging spaces for the students to learn about themselves as being entrepreneurial and one should also address

how to set up education to achieve transformation of individual behaviour. She referred to Pittaway & all. (2007) about changing individual behaviour; “it is about individuals’ identities and understanding how these are shaped through learning”. Neergaard & all. (2021) pointed out there is limited research that focuses on what happens in the classroom and how classroom-based learning environments may influence students’ development of an entrepreneurial identity. Ilonen & all. (2018, 392) argue that there has been little research “addressing the effect and emotion, particularly the related learning outcomes”. Lackeus (2015) and Lackeus & all. (2015) raised that few articles “empirically account for when, how and why learning environments contribute to the development of entrepreneurial competencies”. Middleton & all. (2017) argue, much of the research on classroom activities focuses on identity development in relation to new venture creation, not on how to achieve identity development in the classroom setting by emulating entrepreneurial experiences and learning.

Thaler & all. (2008) were the first to bring up pedagogical nudging as the cognitive means to transform student disposition and their perceived “fit” with becoming entrepreneurial. A nudge is described as an intervention that “alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler & all., 2008). According to Neergaard & all. (2021), the use of pedagogical nudging strategies in entrepreneurship teaching appears to stimulate awareness and understanding of students’ entrepreneurial potential. Pedagogical nudging is positioned as a method, which in the hands of a reflective professional stimulates awareness and provides students with the opportunity to explore their own entrepreneurial identity (Neergaard & all., 2014; 2015). She argue that we should ask: (1) how do students’ perceptions of entrepreneurship change in a transformative learning environment (2) how do students’ previous habitual, unreflected responses affect learning in an entrepreneurship education course? And (3) how can nudging be used to trigger student responses and support potential changes in behaviour to facilitate a better “fit” with entrepreneurship?

In an EE context, Shepherd (2004, 275) suggests entrepreneurial pedagogy should be directed to bring out emotions that reflect the life-world experiences of entrepreneurs, for example the emotions that result from risk taking and failure. Also, the other researchers have highlighted the role of emotion in EE (Lackeus, 2015; Lackeus & all., 2015; Ilonen & all., 2018). Jones & all. (2017) outline “emotional ecology of the classroom” is not translated into widespread development and/or adoption of new pedagogies, in EE”. Such pedagogies could help students manage and learn from (difficult) emotional events and stimulate student awareness about emotions as a channel for new learning outcomes. The emotional element of transformation goes hand in hand with reflection and also links to identity formation (Mezirow, 2000).

Research by Thaler & all. (2008) demonstrate that through the use of persuasive techniques, by presenting choices in different ways, individuals can be steered towards more “effective” decision-making. Thaler & all. (2008) use the concept “libertarian paternalism” which means that there is guidance in the choice towards beneficial behaviour for the individual and for society. The power of this technique must be acknowledged even though the context in which people make decisions is manipulative to a certain extent. People will tend to go with the flow, adhere to the “status quo”; how many of us leave the default option on the computer because making another choice requires effort.

It is argued that emotion helps cognitive retention by supporting student’s “seminal learning experiences” (Taylor, 2010). It is also suggested that classroom-based learning “may not be sufficient to achieve the highest level of affective learning outcomes” (Ilonen & all., 2018), and students may not have the capacity to reflect on entrepreneurial experiences (Hägg & all., 2019). Neergaard & all. (2021) argue that affective, micro-perceptual shocks, as triggers for reflection, can be emulated in the classroom through pedagogical nudging. They focus on how such learning experiences can be used to “nudge” students, supporting them to face their fears and reflect on their habitual responses to risk, challenges and, in turn, their attitudes about themselves, their unreflective behaviours and ultimately their propensity for entrepreneurship. Gauthier (2005) argue, it is relevant for teachers to use nudging as students are in a learning situation where there is an expectation about learning/experiencing something new that entails transformation of the individual. Griffin (2011) explaine, introducing nudging, as a way to, “increase the students” tolerance for uncertainty through the recognition that there may not be one “right” way to address the problem at hand.

Bandura (1994), Bourdieu (1990) argue, people often avoid situations where they don’t feel they are in their comfort zone or where they observe a lack of fit between a field, such as entrepreneurship, and the habitus and the capital they have so far accrued in their life. This means, people are more likely to continue as they are and have been, even though, they have the abilities to change, and their responses and actions may not even be in their best interest. Strong feelings have the potential to encourage students to acknowledge and consciously change behaviours and understandings to identify new different forms of behaviour. Pedagogical nudging has not been seen, as a tool in education, as a way to foster/encourage enterprising behaviour. Pedagogical nudging is not intended to elicit change in behaviour in one way, but rather it is intended to stimulate reflection about un-reflected responses to situations where there has been none previously. Hence, a pedagogical nudge has the potential to aid reflection about behaviours that may or may not result in change in habitus. (Neergaard & all., 2021).

Neergaard all. (2021) continues, the use of pedagogical nudging may unlock doors and bring students beyond the unseen boundaries of the self, towards the kind of learning that develops self-efficacy and an entrepreneurial mindset. The empirical work documents and analyses the lived experience of students in engaging with entrepreneurship and the development of their understanding around the “rules of the game” within the field of entrepreneurship. These sometimes clash with the suggested rules of the game in the field of academia and/or the field of employment. Therefore, care must be taken in creating an environment supportive of transformative learning that will facilitate “identity work” (Nielsen & all., 2012), encouraging students to put their identity, their student habitus and their understanding of their place in the world “at risk”. This can be achieve through experimentation and mimicking entrepreneurial action. For example, imitation may help accelerate the learning process, since mimicking is effective at creating lasting memory and behavioural change (Blakemore & all., 2005).

According to Neergaard & all. (2021), it is important to remember, not all learning environments are suitable for pedagogical nudging. It is likely that institutional norms around assessment may impact on educator agency and their ability to so engage. There could be scope for educators to develop their own interventions inspired by theory. Creating a learning environment, where these experiential forms of identity work can take place, is only possible if there is trust between the educator and the students and among the students. Communication about expectations must be open and explicit and careful planning of interventions, coupled with explanations about learning goals and possible outcomes, is central to this endeavour (Neergaard & all., 2017). The pedagogical nudging described here provides examples of a practice that promotes, strengthens and develops learning beyond the limitations of most existing practice. In developing these interventions, it is important to consider how they impact differently on different students. We are not coercing students to follow a specific path that they do not want, need or aspire to follow; we are simply opening up a door to a different set of opportunities or experiences that will enhance students’ ability to better choose their own path in the future. Indeed, in early iterations educators were confronted by a recurring problem: students did not actively engage with the process but focused on the outcome—how to achieve a good grade.

Gibb (2002) argue that action-oriented pedagogy encourages experiential learning to help students learn problem-solving techniques, project-based learning, inculcate creativity, and is supportive of peer evaluation which is prerequisite to train students for entrepreneurship. This kind of support and exposure help students to be more enterprising, develop useful skills, and exhibit entrepreneurial behaviour, which enables them to be more prepared and ready, in order, to create and manage new businesses.

Methodology and data

In this section I present the perspectives of the methodology I have used in this study. First the main ideas of developmental evaluation and then the case study issues. In addition, I describe the experiential entrepreneurship education case MiniMikkeli which is the target of my research. In the end introduce the data and data gathering, as well, the key results of this case study.

Developmental evaluation

The methodology that I use in this case study is developmental evaluation (Patton, 1994, 317). Developmental evaluation means: *Evaluation processes and activities that support program, project, product, personnel and/ or organizational development. The evaluator is part of a team whose members collaborate to conceptualize, design, and test new approaches in a long-term, on-going process of continuous improvement, adaptation, and intentional change. The evaluator's primary function in the team is to elucidate team discussions with evaluative data and logic, and to facilitate data-based decision-making in the developmental process. Mathison, S. (2005, 116). "The purpose of developmental evaluation is to help develop the intervention or program. In developmental evaluation, evaluators become part of the program design team or an organization's management team. They are fully participating in decisions and facilitating discussion about how to evaluate whatever happens. All team members, together, interpret evaluation findings, analyze implications, and apply results to the next stage of development. Evaluators become involved in improving the intervention and use evaluative approaches to facilitate ongoing program, project, product, staff, and organizational development. In playing the role of developmental evaluator, the evaluator helps make the program's development an R&D activity.*

Already in the 1990's Patton (1994, 313) argued about formative evaluation which carries a bias about making something better rather than just making it different. From a developmental perspective, do something different because something has changed in understanding, the characteristics of participants, technology, or the world. Those changes are dictated by current perceptions, but the commitment to change doesn't carry a judgment that what was done before was inadequate or less effective. Change is not necessarily progress. Change is adaptation. As one program director put it: We did the best we knew how with what we knew and the resources we had. Now we're at a different place in our development-doing and thinking different things. That's development. That's change. But it's not necessarily improvement. The developmental perspective, as I experience it, feels quite different from the traditional logic of programming in which goals are

predetermined and plans are carefully made for achieving those goals. Developmental programming calls for developmental evaluation in which the evaluator becomes part of a design team helping to monitor what's happening, both processes and outcomes, in an evolving, rapidly changing environment of constant feedback and change. These relationships can go on for years and, in many cases, never involve formal, written reports.

Many researchers are trying to understand the effectiveness of entrepreneurship education on participants' entrepreneurial potential (Fayolle, 2014; Rae & all., 2014). Entrepreneurship educations impact on evaluation actions, whether from the perspective of the evolution of entrepreneurial intention and its antecedents or from that of the attitudes associated with entrepreneurship, have many times focused on adults or young people, particularly university students (Fayolle, 2014; Rideout & all., 2013).-According to Stufflebeam & all. (2007, 4-5) *"Proper objects for evaluation cover a wide range of entities e.g. school programs, libraries, museums, hospitals… universities … border control, research plans and findings, theories and many more, all areas of interest to society. Evaluation is the process for giving attestations on such matters as reliability, effectiveness, cost-effectiveness, efficiency, safety, ease of use, and probity. Society and individual clients are at risk to the extent that services, products, and other objects of interest are poor. Evaluation serves society by providing affirmations of worth, value, improvement (and how and when this should happen), accreditation, accountability, and when necessary, a basis for terminating bad programs."*

The evaluation research can be divided into two main categories: those that seek to measure the influence of EE actions on the possible intention to start up a business (Karimi & all., 2014; Piperopoulos & all., 2014; Peterman & all., 2003), evaluating not just intentions but desirability, feasibility and the student's evaluation of entrepreneurial experiences close at hand, and those that analyze the impact of educational actions on the attitudes associated with an entrepreneur, through an examination of how these attitudes may have changed as a result of the educational experience (Volery & all., 2013; Athayde, 2009).

Developmental evaluation (DE) (Patton, 2011) is a way of being useful in innovative settings where goals are emergent and changing rather than predetermined and fixed, time periods are fluid and forward-looking rather than artificially imposed by external deadlines, and the purpose is innovation, change, and learning rather than external accountability (summative evaluation) or getting ready for external accountability (formative evaluation). DE accepts turbulence as the way the world of social innovation unfolds in the face of complexity and adapts to the realities of complex nonlinear dynamics rather than trying to impose order and certainty on a disorderly and uncertain world. Observation is an evaluation method which explored merit and worth, processes and outcomes,

formative summative evaluation. The great unexplored frontier is evaluation under conditions and complexity. DE explores frontiers and supports innovation development to guide adaption to emergent and dynamic realities in complex environments. Innovation can take the form of new projects, programs, products, organizational changes, policy reforms, and system interventions. Informed by systems thinking and sensitive to complex nonlinear dynamics, developmental evaluation supports e.g. social innovation. Evaluation processes include asking evaluative questions, applying evaluation logic, and gathering real-time data to inform ongoing decision making and adaptations. The evaluator (researcher) is often part of a development team whose members collaborate to conceptualize, design, and test approaches in a long-term adaption of experimentation that is keenly sensitive to unintended results and side effects. The evaluator's primary function in the team is to infuse team discussions with evaluative questions, thinking, and data, and to facilitate systematic data-based reflection and decision making in the developmental process. DE is meant to communicate that there is an option in and approach to conducting evaluations that specially supports development. DE helps social innovators adapt to dynamic conditions, explore possibilities to see what works and what doesn't work, make sense of successes and learn from failures.

Patton (2011) argue that DE is first and foremost about doing what make sense. It is grounded in pragmatism and situational adaptation. A lot of evaluation doesn't make sense. A lot of evaluation is designed within tightly contained boundaries, narrowly prescribed parameters, and mandated templates imposed by people who want it done, and done their way, whether it makes sense or not. DE takes us outside evaluation's traditional formative and summative boxes; it questions the utility of mandated midterm reviews and external end-of-project evaluations. It asks whether these things make sense.

Important is to note (Patton, 2011) that, the developmental evaluator supports development. Patton has conducted developmental evaluation as an internal evaluator and as an external evaluator and knows about internal and external evaluators who have played the role of developmental evaluator. In either case, the evaluator becomes part of the development process, asking developmental evaluation questions, bringing evaluative thinking to decision making, adaptations, and development with real-time data and feed-back.

Patton (2011, 75) points out Ten Key Points about Developmental Evaluation

1. Thinking about what is useful and sensible for evaluation can open the door and establish the foundation for developmental evaluation.
2. Developmental evaluation can include both internal and external approaches to evaluation.

3. Developmental evaluation can produce not just findings about progress but materials useful for program development.
4. Watching for and being open to what emerges is central to developmental evaluation.
5. Developmental evaluation requires timely engagement and rapid feedback.
6. Evaluation can become the engine for program development.
7. Ongoing program development and evaluation can become mutually reinforcing, a way of doing business, and a way of thinking.
8. Project leadership and support for doing developmental evaluation is a *sine qua non* (without which there is nothing).
9. Competent evaluators are essential for successful developmental evaluation.
10. Developmental evaluation produces more than improvements; it supports program development.

Patton (2011) mention that DE acknowledges uncertainty, expects it, and accepts that evaluation can increase complexity even while attempting to understand it, by being one more factor among the many already operating and interacting. A primary strategy for coping with uncertainty applies to both programs and evaluations and the interactions between the two: shorten and speed up feedback. The longer the time horizon, the greater the uncertainty. Long-term outcomes and impacts are especially uncertain.

Patton (2011, 194) points out Five Developmental Evaluation Purposes and Uses

1. Ongoing development in adapting a program, strategy, policy, or innovation to new conditions in complex dynamic systems
2. Adapting effective principles to a local context as ideas and innovations are taken from elsewhere and developed in a new setting, the work developmental evaluation in the dynamic middle between topdown and bottom-up forces change
3. Developing a rapid response in the face of a sudden major change or a crisis; exploring real-time solutions; and generating innovative and helpful interventions for those in need; high uncertainty because of lack of knowledge and stakeholder conflict, prime territory for social innovators and visionaries
4. Preformative development of potentially broad-impact, scalable innovation to the point where it is ready for traditional formative and summative evaluation

5. Major systems change and cross-scale developmental evaluation, providing feedback about how an innovation may need to be changed and adapted as it is taken to scale to increase impact and contribute to major systems change.

Patton (2011, 195) argue, the first use of DE is to assist and support social innovators with ongoing adaptation of their interventions in turbulent environments as they encounter the dynamics of complexity. The second use of DE can be to identify principles and patterns of effectiveness that have worked elsewhere, then to help bring them into a new setting and adapt them to the local context. A third purpose and use of DE is to support innovation in responding to crisis within a particular context without concern for scalability. Patton (2011, 206) concretize, DE is useful during the alpha phase reorganization, exploration, and innovation. This is when social innovators try out new ideas, experiment, and learn by doing. DE helps innovators know the difference, moving on from dead ends and further exploring what looks promising.

Patton (2011, 232) raised urgent questions using DE: What is being developed now?, What do the results of what has been developed mean now?, What are the next steps now?, What is the next phase of development now? And remind (2011, 305), DE is a process of engagement. The developmental evaluator is co-creating an innovation with social innovators through inquiry into the nature and consequences of that innovation. The developmental evaluator and social innovators ponder together. The co-creation process involves conceptualizing the social innovation together, generating inquiry questions, establishing priorities for what observe and track, figuring out what data to collect and how to collect it, interpreting findings together, and drawing conclusions together about implications for next steps, especially adaptations in the face of changing conditions, new learnings, and whatever is emerging.

Case Studies

Case studies have been written about in several studies. Flyvbjerg (2004) refers in his article to Abercrombie & all. (1984, 34) who argue *a case study cannot provide reliable information about the broader class, but it may be useful in the preliminary stages of an investigation since it provides hypotheses, which may be tested systematically with a larger number of cases.* He continues, it is correct that a case study can be used 'in the preliminary stages of an investigation' to generate hypotheses, but it is misleading to see the case study as a pilot method to be used only in preparing the real study's larger surveys, systematic hypotheses testing, and theory building and case studies cannot be of value in and of themselves; they need to be linked to hypotheses, following the well-known hypothetico-deductive model of explanation.

Flyvbjerg (2004) argue there are five misunderstandings concerning case studies. These five misunderstandings indicate that it is theory, reliability, and validity which are at issue; in other words, the very status of the case study as a scientific method. According to Fjyvberg (2004, 119) misunderstandings are: *Misunderstanding no. 1. Theoretical (context-independent) knowledge is more valuable than practical (context-dependent) knowledge, and case studies can only provide the latter. • Misunderstanding no. 2. One cannot generalize on the basis of an individual case; therefore, the case study cannot contribute to scientific development. • Misunderstanding no. 3. The case study is most useful for generating hypotheses; that is, in the first stage of a total research process, while other methods are more suitable for hypotheses testing and theory building. • Misunderstanding no. 4. The case study contains a bias toward verification, that is, a tendency to confirm the researcher's preconceived notions. • Misunderstanding no. 5. It is often difficult to summarize and develop general propositions and theories on the basis of specific case studies.*

Flyvbjerg (2004) conclude that the case study is a necessary and sufficient method for certain important research tasks in the sciences, and it is a method that holds up well when compared to other methods in the gamut of social science research methodology.

Siggelkow (2007) on the other hand, raises persuasion with case studies. He argues motivations, inspirations and illustration to use case studies. First, cases are often a great way to motivate a research question. If one's conceptual argument is about why A leads to B, a case can be a persuasive way of demonstrating why this is an important phenomenon. One can offer a purely theoretical motivation, but one that is grounded in a real-life situation is usually much more appealing. The second main use of cases: as inspiration for new ideas. Indeed, the goal of inductive theory generation features quite prominently in many case-based research papers. If only limited theoretical knowledge exists concerning a particular phenomenon, an inductive research strategy that lets theory emerge from the data can be a valuable starting point. The third valuable use of cases in the context of making a conceptual contribution is to employ them as illustration. In terms of final paper structure, the distinction between using cases for inspiration versus illustration is mainly one of sequence. For example, an inductive paper employing a case as inspiration might start with the case and then focus on theory. In contrast, a paper using a case as illustration might more usefully present the case after the theory (which in turn may be preceded by a motivating case example). Although for expositional purposes these differences in presentation may be useful, the research itself tends to be much more iterative, going back and forth between data and theory. Siggelkow concluded that regardless of how cases are eventually used, research involving case data

can usually get much closer to theoretical constructs and provide a much more persuasive argument about causal forces than broad empirical research can.

With regards to building theories from cases Eisenhardt & all. (2007) argue that case studies are a research strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based, empirical evidence. Previously Eisenhardt (1989) argue that case studies are rich, empirical descriptions of particular instances of a phenomenon that are typically based on a variety of data sources (ref. Yin, 1994). Cases can be historical accounts, but they are more likely to be contemporary descriptions of recent events. The central notion is to use cases as the basis from which to develop theory inductively. The theory is emergent in the sense that it is situated in and developed by recognizing patterns of relationships among constructs within and across cases and their underlying logical arguments. Central to building theory from case studies is replication logic previously studies according to Eisenhardt (1989).

Eisenhardt continue (2007) that a major reason for the popularity and relevance of theory building from case studies is that it is one of the best (if not the best) of the bridges from rich qualitative evidence to mainstream deductive research. Its emphasis on developing constructs, measures, and testable theoretical propositions makes inductive case research consistent with the emphasis on testable theory within mainstream deductive research. It should be noted that theory-building research using cases typically answers research questions that address "how" and "why" in unexplored research areas particularly well. According to Eisenhardt (2007), as data in large-scale hypothesis testing research could be asking *How can the theory generalize if the cases aren't representative?* A key response to this challenge is to clarify that the purpose of the research is to develop theory, not to test it, and so theoretical (not random or stratified) sampling is appropriate. Theoretical sampling simply means that cases are selected because they are particularly suitable for illuminating and extending relationships and logic among constructs. She ponders about single-case studies and multiple-case studies and argues while single-case studies can richly describe the existence of a phenomenon (ref. Siggelkow, 2007), multiple-case studies typically provide a stronger base for theory building (ref. Yin, 1994). Case studies can accommodate a rich variety of data sources, including interviews, archival data, survey data, ethnographies, and observations.

Welch & all. (2011) want to open alternatives that case research is suited only to inductive theory-building. They seek to challenge this belief by offering alternatives to inductive theorising and broadening the possibilities. The first alternative views the case study as a natural experiment for confirming or modifying existing theory. This method attributes greater explanatory power to the case study than does inductive theory-building. The second alternative, by conceiving case research

as a form of interpretive sensemaking, affirms the value of contextualisation to theorising. However, these two alternatives are both potentially limiting, because they set up a trade-off between the strengths of internal validity on the one hand and thick description on the other. They also note there are two problems in relation to the case study. The first is that because the generalisability of case study findings is low, its theorising potential is ultimately regarded as inferior to that of hypothesis-testing research. Case studies are therefore confined to the initial, exploratory phase of research, and their potential for generating causal explanations is overlooked. Second, while all qualitative research is commonly assumed to be context sensitive, a strong trend towards de-contextualisation has in fact prevailed in much case research. To theorise is to generalise away from context, "explaining" and "contextualising" are regarded as being fundamentally opposed. Welch & all. (2011) refer to Eisenhardt's (1989, 547) model of theorizing process which regards observation as the basis for theory development. Process of observation can be objective, with the researcher achieving validity and reliability through the minimisation of bias. Welch & all. (2011) continue and refer to Eisenhardt & all. (2007, 30) case researchers need to escape the "idiosyncratic detail" of individual cases and conclude with "only the relationships that are replicated across most or all of the cases". It is noted by Welch & all. (2011), that case studies are a form of interpretive sensemaking is part of a rich tradition of "idiographic" rather than nomothetic social science; in other words, a social science that seeks to understand the particular rather than generate law-like explanations. Unlike positivist epistemology, which insists on the unity of the social and natural sciences, interpretive approaches emphasise the uniqueness of the social sciences, in which subjects ascribe meaning to their own behaviour, and researchers are part of the world they study. Welch & all. (2011) conclude that they have demonstrated that case researchers have a choice about how to theorise, just as they have a choice about how to produce and analyse data. They encourage researchers to reflect critically upon their own and others' preconceived views of how to theorise from case studies; to explore possibilities for theorising that go beyond that of inductive theory-building; and to escape the trade-off between internal validity and thick description that is found in positivist and interpretive paradigms. From the perspective of those reviewing case research, the typology provides the means to evaluate theoretical contributions.

Yin (2009, 9) wants to remind that case studies are best suited to "how and why" questions and these deal with operational links needing to be traced over time. He argues that, like the experiment, the case study generalizes to theoretical propositions and not to populations. Thomas (2011) argues case studies are analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods.

Ridder (2017) writes that typical for case study research is non-random sampling; there is no sample that represents a larger population. Contrary to quantitative logic, the case is chosen, because the case is of interest, or it is chosen for theoretical reasons. For within-case and across-case analyses, the emphasis in data collection is on interviews, archives, and (participant) observation. Case study researchers usually triangulate data as part of their data collection strategy, resulting in a detailed case description. Potential advantages of a single case study are seen in the detailed description and analysis to gain a better understanding of ‘‘how’’ and ‘‘why’’ things happen. In single case study research, the opportunity to open a black box arises by looking at deeper causes of the phenomenon. The case data can lead to the identification of patterns and relationships, creating, extending, or testing a theory. Potential advantages of multiple case study research are seen in cross-case analysis. A systematic comparison in cross-case analysis reveals similarities and differences and how they affect findings. The case study research has different objectives in terms of contributing to theory. On the one hand, case study research has its strength in creating theory by expanding constructs and relationships within distinct settings (e.g., in single case studies). On the other hand, case study research is a means of advancing theories by comparing similarities and differences among cases (e.g., in multiple case studies).

Ridder (2017) completes Eisenhardt, Yin, Stake and Burawoys views on case study research design. Ridder’s completed case study portfolio see below in table 1. Ridder’s original table compiled by author, 2022.

Portfolio of case study research design by Ridder 2017, 292. Table complied by author, 2022.

	Case study research desings			
	No theory first	Gaps and holes	Social construction of reality	Anomalies
Scholars	Eisenhardt	Yin	Stake	Burawoy
The case	Research question: A priori constructs, variables; No assumed relationship	Research question: Existing theory; Proposition; Framework	Curiosity in the case; Understanding of research issues	Curiosity; Existing theory; Anomalies; Internal contradictions; Gaps, silences
The case	Theoretical sampling; Qualitative data as the primary choice	Purposeful sampling; Qualitative data as the primary choice	Purposive sampling; Thick descriptions; Holistic comprehension	Theoretical ampling; Dialogue of observer and participants
The analysis	Emerging constructs and relationships	Pattern-matching as a primary choice; Analytic generalization	Learning from cases; Categorial aggregation	Participant observation Social processes; Structuration; Reconstruction of theory

Table 1. Portfolio of case study research design by Ridder 2017, 292. Table complied by author, 2022.

A closer look at the table shows that in my own study, the case study adheres to a research design based on YIN’s views. I have research questions, existing theory and propositions, framework (BAS) which I’m testing. Data was collected from case MiniMikkeli years 2016-2019 and as mentioned

earlier qualitative data is the primary choice (the data are too small for a quantitative study). Pattern-matching and analytic generalization were the primary choices of data analysis used.

Data Gathering

I presented the idea of doing a developmental evaluation case study of the EEE process, case MiniMikkeli, to the Director of basic education for the City of Mikkeli in autumn 2019. I started the data collection in November 2019 after being granted research permission (MliDno-2019-154 Research permission / Anne Gustafsson-Pesonen). The developmental evaluation case study data was collected using questionnaires (via webropol) and semi-structured interviews (via teams) as well as observations throughout the whole EEE process (case MiniMikkeli). The case study focuses on the years 2016, 2017, 2018 and 2019 case MiniMikkeli processes. The data gathering started at the beginning of December 2019. The questionnaires were sent via webropol to teachers of 6th grade. The research target group consisted of 109, 6th grade teachers, but only 90 were active e-mail addresses. There were two reminders sent after December (January 2020 and February 2020). The number of respondents to the questionnaire (via webropol) was confined 23 (N=90) responses. Unfortunately, it is difficult to carry out persuasive quantitative analysis with such really a small number, that is why the main research data relied upon is observations (in AB meetings, in actual MiniMikkeli) and semi-structured interviews (AB members, teachers from 6th grade and HEI students). Together, 8 Interviews were conducted. The interviewees were teachers from basic education 6th grade (N=90), from the case MiniMikkeli advisory board (AB) which included EE experts, directors of the Mikkeli basic education, case MiniMikkeli partners, HEI representatives (N=6) and higher education students (N=8), who participated throughout the EEE process acting as guides, advisors and business idea evaluators to the grade 6 students. Observation took place as well at the AB meetings before, during and after the whole EEE process (case MiniMikkeli). Note: the amount of 6Th graders was more than 2300 during years 2016, 2017, 2018 and 2019.

Because the whole EEE process (case MiniMikkeli) has been built around the Behaviours, Attributes and Skills (BAS) frame (see below: The concept of EEE process, case MiniMikkeli) the questionnaire and the semi-structured interviews I compiled around BAS. I asked respondents' views on entrepreneurship, entrepreneurship education and how to develop on basic education on 6th grades and HEI students' entrepreneurial mindset. Respondents were also asked to comment on their experiences during the case MiniMikkeli, as well as successes and areas for development of experiential entrepreneurship education in grade 6 and HEI education.

At the beginning, I informed the target group (N=109) via email (November 29th, 2019) *the Developing research of EEE process case MiniMikkeli*. Unfortunately, some of the email addresses

were no longer active as some of the teachers no longer worked in Mikkeli. The final number of teachers in the research target group was N=90. The questionnaire was sent via Webropol with a personal link on December 4th, 2019. Because of the Christmas holiday rush, only a few answers were received. I sent the first reminder on January 15th, 2020 to those teachers who had not responded. The reminder helped as 10 additional responses were received. The second reminder I sent February 19th, 2020. A total of 23 responses were received in all (% = 25,55 % of N=90). At the end of the questionnaire there was an invitation to join a semi-structured interview via teams in spring 2020. Only one teacher was able to take part in the interview. A second teacher interview I conducted after I sent a request to everyone (N = 90) to participate in the interview. Participants were informed that the Teams interview would be 30 minutes. Two teachers (T) interviews were conducted: T1: May 8th, 2020 and T2: May 15th, 2020. It was agreed with the AB that I could observe and interview experts from the AB. The Advisory board included six people. Expert (AB) interviews were conducted via Teams and a total of 4 interviews were conducted (AB1: February 22nd, 2021, AB2: February 23rd, 2021, AB3: March 22nd, 2021 and AB4: March 29th, 2021). I received the student (HEI) interviews through the AB recommendation (HEI1: May 4th, 2021 and HEI2: May 6th, 2021). A total of 8 HEI students spanning the years 2016, 2017, 2018 and 2019 participated in the case MiniMikkeli actions. In addition, I had access to see, read and utilize second-hand data that was received via AB. The second-hand data included some notes, findings from 6th graders ideas and insights, what recommendations they have for the development of the whole EEE process, case MiniMikkeli.

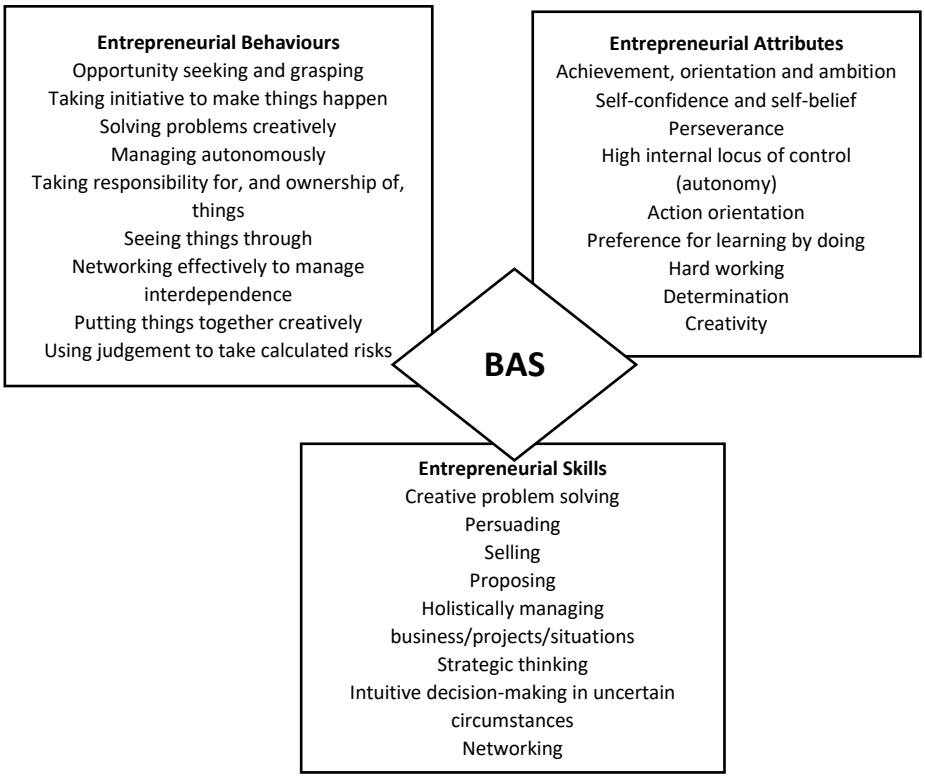
Observation was possible during the AB meetings before, during and after the whole EEE process, case MiniMikkeli. Bachelor theses about the development of the whole EEE process, case MiniMikkeli have been written (Rautiainen, 2016; Hirvonen, 2018). These theses could be seen, as the observation data of developmental evaluation of the whole EEE process, case MiniMikkeli.

The Foundation of the EEE process - case MiniMikkeli

In my previous study (Gustafsson-Pesonen, 2019) I tested the Entrepreneurial Behaviours, Attributes and Skills frame (later BAS) (Gibb, 2005b) and I built recommendations for entrepreneurial teacher training development and I created the entrepreneurial path model from one school level to the other. The foundation of BAS is to support target groups actions to be more active and entrepreneurial (Gibb, 2005b, Fayolle & all., 2006a; Fayolle & all., 2006b; Fayolle, 2007; Fayolle & all., 2008; Kyrö, 2005; Kyrö & all., 2008; Diensberg, 2008; Gustafsson-Pesonen & all., 2012; Klapper & all., 2016; Arpiainen, 2019). The questionnaire and semi-structured interviews I developed were based on BAS. The whole EEE process, case MiniMikkeli, is built around the BAS frame. The main theme in the EEE process, case MiniMikkeli, is to develop basic education school 6th grade and higher

education students' entrepreneurial mindsets, attitudes and skills in order to influence entrepreneurial behaviour, entrepreneurship and self-employability My main research questions are: 1. How has the case MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education in respondents' opinion? and 2. Is included in the case MiniMikkeli experiential entrepreneurship education both in basic education 6th grade and higher education (so that in long term the teaching influences students' entrepreneurial behaviours, attributes and skills as well mindsets and attitude)?

In addition, I wanted to understand and try to find answers to the questions: How, Entrepreneurship Skills and Competencies, have developed with the case MiniMikkeli? How the attributes associated with entrepreneurship changed with the case MiniMikkeli? Has the case MiniMikkeli influenced on Entrepreneurial behaviour? As well my sub-questions were: What entrepreneurship is? What entrepreneurship education is?



Picture 1. The Foundation of the whole EEE process, case MiniMikkeli: Entrepreneurial behaviours, attributes and skills (BAS) by Gibb (2005b), compiled by the author (Gustafsson-Pesonen, 2019).

Picture 1. assembled the factors which should include and be visible in the EEE process when trying to help support students' entrepreneurial mindsets, attitudes and skills in order to influence entrepreneurial behaviour, attributes, skills and self-employability.

Several studies of EE have been interested in creating entrepreneurial pathways for the whole education system (e.g. Gustafsson-Pesonen, 2019). I am interested in what kind of entrepreneurial pedagogy and actions have a positive impact on entrepreneurial behaviours, attributes and skills and develop entrepreneurial working life skills. The EEE process became familiar while evaluating the case MiniMikkeli. MiniMikkeli is the EEE process, case for basic education in 6th graders together with the teaching of HEI. The case MiniMikkeli is controlled and led by the City of Mikkeli Education department and the teaching of the EEE process is part of the 6th grade curriculum (L6: Students working life skills and entrepreneurship, https://mikkeli.cloudnc.fi/download/noname/%7B6f6adc78-9c19-4ff6-a1ac-6f79571d954b%7D/14013). The EEE process, case MiniMikkeli, is produced together with the Mikkeli city basic education, HEI and the Mikkeli region business community.

The Developing of the EEE process, case MiniMikkeli

At the basic level of education, entrepreneurship education can be seen to focus on internal entrepreneurship. Internal entrepreneurship refers to a person wanting to be entrepreneurial and that everyone acts entrepreneurially. Internal entrepreneurship includes initiative taking, responsibility, problem solving, identifying strengths and to be interested in several things (EDU 2014; OPH 2014,157.) Experiential entrepreneurship education, serves several kinds of experiences which illustrate the real working life, different kinds of roles in working life and experiences of entrepreneurship (OPH 2014, 157.) The main idea in the EEE process, case MiniMikkeli is to test, to feel, to play, to do experiences of working life and entrepreneurship.

The case MiniMikkeli is an experiential entrepreneurship education process, entrepreneurial actions, start-up own business (JA – Junior Achievement, Pikku-Yrittäjät) and working life skills elements are included. The process, case MiniMikkeli is described in picture 2. The case MiniMikkeli EEE process – basic eduaction 6th grades meet HEI and business. Kuoppala (2019) wrote in her paper *"the concept of MiniMikkeli is a learning package for entrepreneurship and society education aimed at basic education 6th graders. The aim is to strengthen the working life readiness of both basic education students and HEI students. The concept has been developed in strong regional co-operation, utilizing development methods (e.g. Tuulenmäki & Välimäki, 2011). Pedagogically, the concept implements phenomenon-based learning in education (e.g. Muukkonen, 2012) and the working life pedagogy of the HEI (Costley, 2007; Tynjälä, 2009)."* https://lehti.yliopistopedagogiikka.fi/2019/02/11/minimikkeli-yrittajyys-tapahtuma-oppimisymparisto/.

The first EEE process, case MiniMikkeli, took place in the spring of 2016. Its planning was started in the autumn of 2015 led by the City of Mikkeli, the Mikkeli Education together with a couple of some key active entrepreneurship education experts, persons from Mikkeli region. These activators set up an Advisory Board (AB) to lead the development process. The reason for starting the development EEE process was that Yrityskylä (https://yrityskyla.fi/en/) led by TAT (https://tat.fi/en/frontpage/) had been taken out of Mikkeli. Both director of Mikkeli Basic Education and CFO of Mikkeli together with key EE experts from Mikkeli region understood *"if in Mikkeli, there is no entrepreneurial, experiential entrepreneurship education actions, events, places for basic education, what kind of signal this is about Mikkeli region? Is there any future? Is there any entrepreneurship? – the signal is there is nothing".* In addition, it was not desired that Mikkeli's 6th graders be transported by bus to different parts of Eastern Finland. The third reason was that, in addition, only to developing working life skills, there was a strong desire to develop entrepreneurial skills in part of the EEE process, case MiniMikkeli. The EEE process focus had to be on working life and entrepreneurship skills, understanding society and raising awareness of what Mikkeli is. The EEE process, case MiniMikkeli wanted to be tied to part of 6th grade curriculum (L6: Students working life skills and entrepreneurship. *https://mikkeli.cloudnc.fi/download/noname/%7B6f6adc78-9c19-4ff6-a1ac-6f79571d954b%7D/14013).* These are the reason why we (AB) started developing our own entrepreneurial experiential entrepreneurship process together with the case MiniMikkeli. The vision and mission are "New experiential entrepreneurial education, working life skills for our future – experiential co-operation working together with basic education, VET (vocational education) and HEI with the regional business community, SMEs and the others. The case MiniMikkeli is owned by Mikkeli city, Mikkeli Education. Picture 2 is compiled by the author of the EEE process, case MiniMikkeli. Note! VET joined in developing and and participated in the case MiniMikkeli for the first time in 2020. For that reason, VET is not mentioned in picture 2. Picture 2 illustrates the whole EEE process, case MiniMikkeli year 2019.

From the beginning, it was clear that the EEE process, case MiniMikkeli, has to be a unique, continuing developmental process, which must change constantly. It was decided, it should be like the city of Mikkeli but in mini size. It should be noted that no separate development resource or financing was available for to this. The development was based purely on the enthusiasm of key persons involved in developing entrepreneurship education, their willingness to test experiential entrepreneurship and their desire to develop a new type of EEE process, case MiniMikkeli.

From the very first implementation, the right employing companies, SMEs were invited so that 6th graders were able to apply for real jobs participate in interviews and work in the jobs during the

actual MiniMikkeli event. Of course, that was like a play. The 6th graders were playing different roles, acting as role models and entrepreneurs during the event.

The AB chose the Pikkuyrittäjät model (https://pikkuyrittajat.fi/in-english/) for the foundation of the entrepreneurship path. (the Pikkuyrittäjät, is a nine theme learning program for elementary school where students found their own startups in small groups. The program consisst of two lessons entireties each with their own topic. At the end, the students get to present their startups and sell their products to real customers paying with real money https://pikkuyrittajat.fi/in-english/). Alongside the development experiments aimed at 6th graders, teacher training and the development of entrepreneurship pedagogy took place. There were two workshops for the development of teachers' pedagogical skills, made possible by the YES regional activities (https://yesverkosto.fi/en), as the main means of EE development. In addition, the above-mentioned free materials developed by Junior Achievement (JA) (https://nuoriyrittajyys.fi/en/teachers/) for teachers were used to develop teachers' EE. The idea was that teachers have quite a free hand to make the event look like their class and the YES regional actor who was at the same time the NY regional manager as well as the AB members is free to support the teachers if needed.

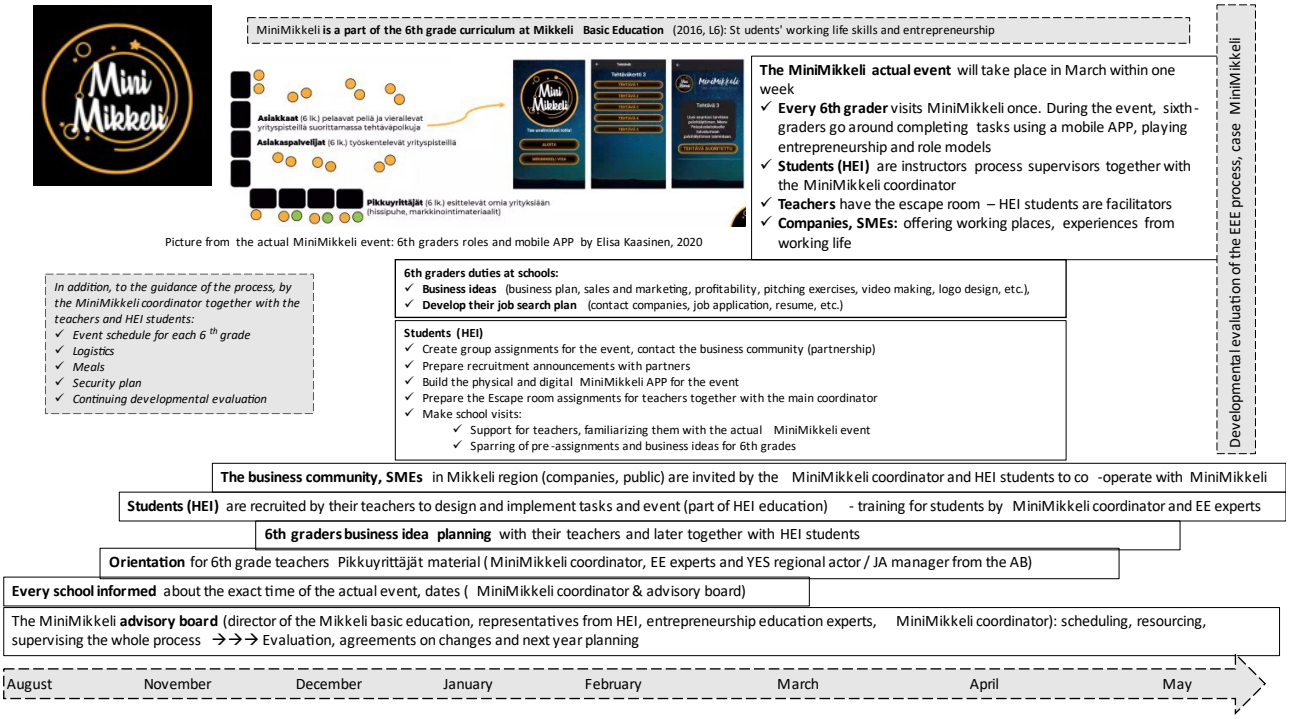
In addition, business, SME and community co-operation went hand in hand. The purpose of business, SME and community cooperation was to involve companies in the area around the event and in the actual event by highlighting job opportunities.

Preparations for the second EEE process, case MiniMikkeli started in May 2016 led by AB. The starting point for the developmental process was the feedback received from teachers, students, companies / communities and AB members of the first implementation. The dates of the second implementation was decided by March 2017 by decision of AB. Schools were informed already in August 2016, in order to have more preparation time which was asked by teachers during the first EEE process. HEI students wanted to participate, so the AB invited the lead person of pedagogical development from HEI to the AB meetings. She found that the EEE process, case MiniMikkeli, is a meaningful and suitable part for HEI education, e.g. internships, development of digital learning, communication studies, guidance and counseling studies, development of business cooperation, business studies, organization of an event etc. She promised to offer the EEE process, case MiniMikkel, as part of the structures of HEI education. Students were recruited for the development and production of the second EEE process, case MiniMikkeli. Students came from business studies, restaurant and tourism studies, community pedagogy and computer science.

For support of the YES regional actor/NY regional manager, students from HEI were recruited to lead workshops and to act as teacher supporters in the schools. The role of the HEI students was to spar

with 6th graders about their business ideas, to spar with job applications, to give feedback on job applications and to spar for job interviews. The HEI students were doing business cooperation, i.e. they were trying to get companies/SMEs involved in the actual event. The students were also given the task of developing the communication of the event and e.g. videos from the actual event, as well as, the MiniMikkeli logo were produced as student work. Also, as student work began, a MiniMikkeli mobile application was being developed, which was tested for the first time in 2017.

An event producer was hired for the EEE process, case MiniMikkeli, which was made possible by the funding of the City of Mikkeli's education. The event producer was participated part-time in the whole EEE process, case MiniMikkeli, and employed by HEI at other times, so the cooperation between MiniMikkeli and HEI was made easier. In addition to the event producer, the case MiniMikkeli coordinator was recruited from the HEI students, whose task was to take responsibility for the practical implementation and to act as a coordinator and presenter during the actual days of the event. Part 1. the entrepreneurship path was built around the Pikkuyrittäjät and part 2. the role of staff / employee was built together with companies and SMEs from the Mikkeli region. The place for the actual event changed from University campus to University of Applied Sciences campus. In addition, so that every 6th grader could be both entrepreneur, employee and customer, the roles were changed during the actual event. MiniMikkeli mobile (APP) were also tested. There was a game in the APP inquiring about and assessing what it is like to be an entrepreneur, being at work and being a customer.



Picture 2. The case MiniMikkeli EEE process – basic education 6th graders meet HEI and business. Compiled by author, February 22nd, 2022

Picture 2. illustrated the whole EEE process, case MiniMikkeli in 2019. It lasts the whole school year from August to May. As mentioned before, it is part of Mikkeli basic education 6th grade curriculum: Students working life and entrepreneurship.

Results

Continuous feedback is a prerequisite for development

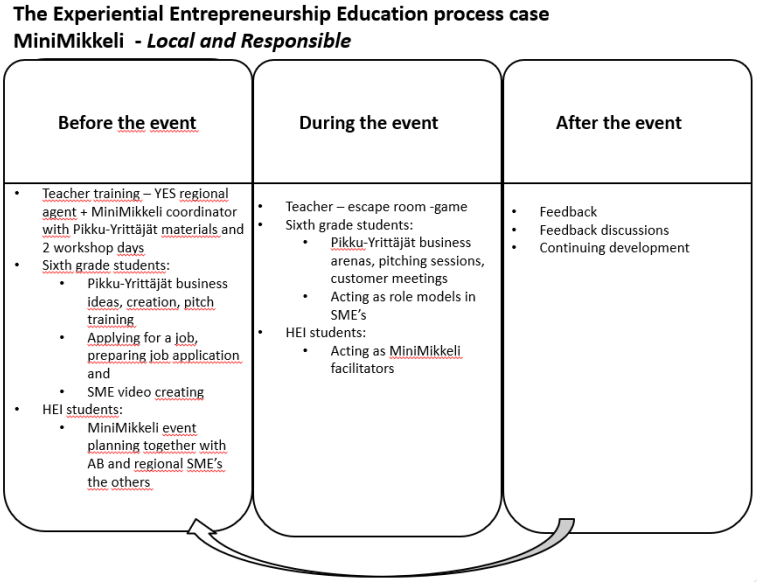
After the first implementation, it could be stated that the EEE process case MiniMikkeli 2016 was successful. Based on the feedback from the 6 the graders, it was unfortunate that not everyone was able to become entrepreneurs in the actual MiniMikkeli event, but the classes themselves selected the best business ideas for the event in the pre-qualifiers. To borrow 6th graders, “some got a job,” and “only some got entrepreneurs”. These statements from 6th graders are a good illustration of the entrepreneurial atmosphere that was created during the first EEE process case MiniMikkeli implementation among 6th graders. Based on an ex-post evaluation session for teachers who participated in the first implementation, the teachers felt that the children had been able to develop both their working life skills and their entrepreneurial skills. Criticism was given by the teachers that the concept was still a draft and there was too little preparation time for them. Teachers said they spent a disproportionate amount of time on both the preparations and the actual MiniMikkeli event. Teachers felt they needed more support, ready-made materials and clear instructions. Teachers pointed out that digital learning and playing, should be connected both around the whole EEE process case MiniMikkeli and to the actual event. Both AB and 6th grade teachers felt that the role of HEI students should also be developed into the EEE process case MiniMikkeli. It was also pointed out that the EEE process case MiniMikkeli and actual event needs a producer who takes responsibility for the management of the whole. The feedback from the companies was positive and they felt they wanted to join in the future. Companies and communities pointed out, however, that communication about the whole EEE process and actual MiniMikkeli event needs to be developed. The place of the actual MiniMikkeli event was also asked to be considered. The facilities in University campus were considered too small.

After the second implementation, the EEE process case MiniMikkeli 2017, the feedback was: the event had already begun to intensify, according to both teachers, companies, AB and HEI representatives. The 6th graders expressed feedback: “nice, nice, inspiring, nice when you don’t have to be in school, boring, too much work”. Teachers’ comments: teachers could have their own role in the actual MiniMikkeli event. Mobile app development was recommended. Similarly, more school visits were desired.

The feedback received after the third implementation, the EEE process case MiniMikkeli 2018, was encouraging. School visits (HEI students) were found to be very useful. Both the teachers and the

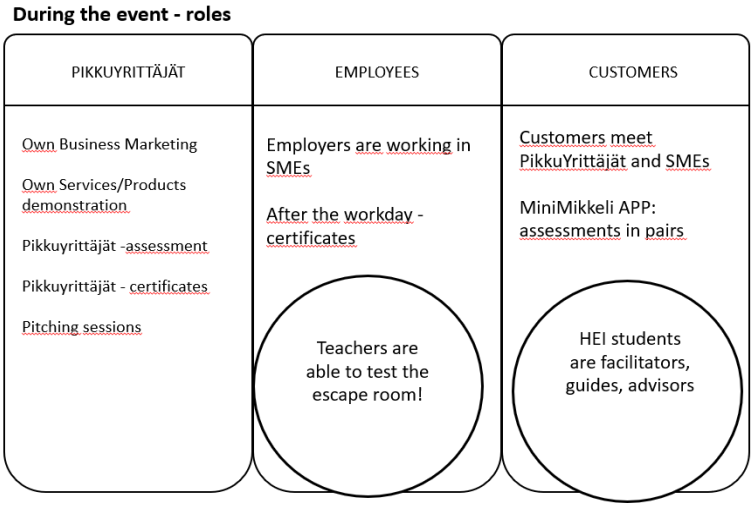
students in basic education got to know the authors/facilitators-and the students from HEI. The idea of the whole MiniMikkeli is good in itself: there is no competition, you can do it with a friend. The teacher's escape room is a good addition. Teachers said: "Sometimes it goes too easy to help students". Teachers also said "it is easy it is easy and natural to combine MiniMikkeli with several subjects (e.g. *in native tongue: how to write job applications; in mathematics: profitability calculations; in social studies: what are the forms of business; in art: business logo; in religion: business ethics).* In addition, it was pointed out that 6th graders' ability e.g. business skills, introduce yourself, greet guests should be developed before the actual event, so that there is no need to get excited about these situations at the event. The Pikkuyrittäjät material was a bit confusing. Sometimes there were problems with the MiniMikkeli APP. Development ideas were raised: make a video to support the Pikkuyrittäjät, what really needs to be done at school. In the actual MiniMikkeli event, it was felt that the business points / workplace should have more to do with the employees. MiniMikkeli should also have its own separate MiniMikkeli Handbook with only MiniMikkeli things. Instructions for making a job application were needed, clarifications for process guidance were asked. Finally, based on the feedback of implementation 2018, before the actual event, schools should go through: e.g. *different grouping exercises so that pupils from 6th grade don't have to get excited in the actual event, it is very important to consider the Pikkuyrittäjät and employees in the actual event, earlier information of MiniMikkeli for schools is necessary and as schools have different cultural and religious backgrounds, these factors must be taken into account and respected at all times during the actual event.*

The next two pictures illustrate the summary of the developing process years 2016, 2017, 2018 of the case MiniMikkeli. Picture 3. The Concept of the EEE process case MiniMikkeli (before-during-after the event) after the developing 2016, 2017, 2018 implementations and 4. The Roles clarifying in the actual event, case MiniMikkeli.



Picture 3. The Concept of the EEE process case MiniMikkeli (before-during-after the event) after the developing 2016, 2017, 2018 implementations. Picture compiled by author 17.2.2022.

Picture 3 describes the key actions, to do list, what should be done before the actual MiniMikkeli event with teachers, with 6th graders and who is responsible for what. There is, also, what happen during the actual event and what shall do after the actual MiniMikkeli event. Picture illustrate the situation before year 2019 implementation.



Picture 4. The Roles clarifying in the actual event, case MiniMikkeli. Picture compiled by author 17.2.2022.

Picture 4. depicts the roles which are played in the EEE process, case MiniMikkeli. For 6th graders there are three roles: entrepreneurs = Pikkuyrittäjät, employees and customers. In addition, HEI student act as facilitators, guides and advisors for 6th graders as well as for teachers. Teachers' role in the actual MiniMikkeli event is to survive the escape room. The roles are compiled after 2016, 2017 and 2018 implementations.

Background issues

The gender and age of respondents are comparable with respect to the normal distributions of basic education in Finland (Sivistystyönantajat, 2017). The Majority of Respondents (N=23) were women (65%). In addition, the age distribution of the respondents follows the normal distributions of teachers' age in basic education in Finland. The age range was between 40-59 year for 83 % of the Respondents. The length of the respondents' teaching careers was also of interest. As can be seen, the careers have been quite long. Also, with regard to this question, it can be stated that the group of respondents follows the normal distributions in relation to Finnish teachers' careers (Sivistystyönantajan, 2017). See appendix 2. The Gender, the Age and How many years you have been a teacher of Respondents.

The last background question I wanted to know which years teachers participated in the EEE process case MiniMikkeli. It is possible to see that there are some teachers who participated more than once in MiniMikkeli. This is good as it increases the reliability of the study. It is more likely that a teacher's experience and perception of MiniMikkeli has evolved after they have participated more than once. Teachers are likely to have more insight into the functionality of the EEE process case MiniMikkeli and its impact on 6th grade entrepreneurship education experiences. See appendix 3. When have you participated in MiniMikkeli as a teacher?

The results from data based on questionnaire

Below I will highlight some of the findings that were found from the survey, based on questionnaire via webropol (N=90 only 23 respondents). The questionnaire was built around the foundation Behaviours, Attributes and Skills (Entrepreneurial behaviours, attributes and skills (BAS) by Gibb (2005b), compiled by the author (Gustafsson-Pesonen, 2019). The first main theme in the questionnaire addressed: "How Entrepreneurship Skills and Competencies have developed with MiniMikkeli". It should be noted that before the EEE process case MiniMikkeli there was no starting point survey done. Respondent's answers were focused, "somewhat agree" or even "don't know". I bring up only two propositions: "MiniMikkeli has developed skills in making proposals" and "MiniMikkeli has developed project management skills" in which more than 50% of respondents argued there has been an impact on 6th graders skills and competencies. See appendix. 3. The Development of Entrepreneurial Skills and Competences. The second main theme in the questionnaire is: "How the attributes associated with entrepreneurship changed with MiniMikkeli?". Again, we must remember the small number of respondents (23). I just point out the propositions: "Learning by doing has increased", "Project work skills have been developed", in which a significant proportion of respondents felt a change had taken place. See appendix 4. The Development of

attributes related to Entrepreneurship with MiniMikkeli. The third main theme concerned entrepreneurship behaviours: “Has MiniMikkeli influenced the behaviour to start a business?”. Some positive changes have been seen in respondents’ opinions as well “The understanding of the business plan has developed” and ”Marketing and sales skills are part of working life and entrepreneurial skills”. However, no change was perceived in the following:” It is easier to talk about changes of business ownership” and “it is easier to talk about business ownership and link them to teaching”. See appendix 5. The case MiniMikkeli influence on Entrepreneurial Behaviour.

Analytic generalizations from the Case Study Interviews and from the Open Questions of Questionnaire

Earlier I mentioned, in this case study, I used a research design based on YIN’s views (see Ridder 2017, 292). I tested research questions, existing theory, propositions and BAS framework. The EEE process case MiniMikkeli, years 2016-2019, was used for purposeful sampling. As mentioned earlier qualitative data is the primary choice as the number of respondents is too small for a quantitative study. Data analysis was primarily done using pattern-matching as well as analytic generalization.

I conducted a total of 8 case study interviews. There were two teachers from basic education 6th grade. One teacher (T1) participated in the EEE process case MiniMikkeli 2016 and the other one (T2) 2016 and 2018. Teacher interviews were done via teams T1: May 8th and T2: May 15th,2020. Second interviews were done in spring 2021. Four members of the AB (Advisory Board) were interviewed. They had all been involved in the development of MiniMikkeli from the beginning (from autumn 2015) and are still involved in MiniMikkeli AB. Interviews were done via teams: February 22nd, 2021 (AB1), February 23rd,2021 (AB2), March 22nd, 2021 (AB3) and March 29th,2021 (AB4). The roles of AB interviewees, in the EEE process case MiniMikkeli were chief coordinator / coach of *PikkuYrittäjät* model, chief coordinator of MiniMikkeli, project manager of MiniMikkeli, development manager of basic education in Mikkeli. The third interviews were also done in Spring 2021. These were two HEI students who both participated in MiniMikkeli in 2018 and 2019. Interviews were done via teams: May 4th,2021 (HEI1) and May 6th ,2021 (HEI1). In addition, I have been able to read an unpublished report related to “MiniMikkeli Development Needs 2018” as part of these two students ’community pedagogy studies in South-Eastern University of Applied Sciences. The issues gathered in the report confirm the points raised in their interviews.

The duration of the interviews was 30-45 minutes, and a semi-structured interview body was used for the interviews. The body of the interview was assembled around a BAS frame. At the beginning of the interview I presented the same statements to the interviewees based on BAS as had been presented in the questionnaire. The replies received to the allegations largely followed the replies to

the questionnaire. Therefore, in this section, I focus on the answers that emerged from both the interviews and from open questions in questionnaire data: *what entrepreneurship is, what is entrepreneurship education and how has MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education* in respondents' opinion.

In addition, teachers, HEI students and AB members were asked what *6th graders have said about entrepreneurship, entrepreneurship education and experiential entrepreneurship education to them* as feedback. The 6th graders' opinions and thoughts are the feedback that the teachers, AB members and HEI students received during the EEE process case MiniMikkeli. Feedback is provided by interviewees. I have not collected 6th graders' feedback. This is why the 6th graders' feedback is considered as a second-hand data. Consequently, in the questionnaire and interviews were questions concerning *what entrepreneurship is, what is entrepreneurship education* and *how has MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education*. The summary of these three questions is included in this section in tables 2, 3 and 4. In these summaries are conclusions from the answers of the questionnaire (together there were 23 respondents) as well as from the interviews (T1, T2, AB1, AB2, AB3, AB4, HEI1, HEI2).

The following tables 2, 3 and 4 summarize both the open-ended responses to the survey and the output of the interviews. The tables are: 2. Compilation of answers: what entrepreneurship is, 3. Compilation of answers: what entrepreneurship education is and, 4. Compilation of answers: how has MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education.

The main themes of the teachers', AB members' and HEI students' answers to the question: *What entrepreneurship is?* can be summarised as: *Entrepreneurship is business* and *Entrepreneurship is attitude*. These two themes could be seen as the main themes of teachers', AB members' and HEI students' opinions of what entrepreneurship is. It can be seen that the answers are in line with previous studies. In teaching, the theme of entrepreneurship still often shows up as a business start-up, according to research. Thus, it can be seen from the data that the perspective of starting a company is still strong. Especially the 6th graders brought up the perspectives of business start-ups and doing their own thing. Of course, teachers, AB members and HEI students have also highlighted a broader perspective on entrepreneurship than just starting a business. Increasingly, different social and working life skills also appear to be part of the concept of entrepreneurship among teachers, AB members and HEI student opinion.

In addition, 6th graders opinions about *what entrepreneurship is*, based on feedback from teachers, AB members and HEI students is only one category. It was discovered that 6th graders have a very realistic image of entrepreneurship. Their opinions, actually, largely follow the views of teachers, AB members and HEI students on entrepreneurship.

Teachers', AB members' and HEI students' opinions (together 23 respondents)		**Thoughts from 6th grade students based on feedback from teachers, AB members and HEI students'**
Entrepreneurship is business	Entrepreneurship is attitude	Summary of 6th graders
Starting your own business	*Value creation to society*	*Entrepreneurship is nice/fun*
Livelihood	*A pillar of society, the well-being of society, the functioning of society*	*Finding, doing your own thing*
Profitable, financial gain	*Courage, risk-taking, freedom, going your own way, finding your own thing*	*Encouragement, seeing your own ideas*
Service trading for the customer (II)	*Attitude, activity in one's own life, perspective on how things work and should work in this society and open-mindedness at work*	*Working for your own ideas*
Business development and the creation of new companies to meet the needs of the market. Freedom to pursue a business idea; business	*Taking action, accomplishing, being active in that own life. Want, dare to take action*	*Through hard work, a hobby can produce financial results*
An alternative to paid work	*Activity, self-direction, self-reliance, doing things together, state of mind, character trait*	*Starting own business*
Starting a business is the top of the iceberg	*Planning, directing and implementing your own activities, knows what you want and strives for. Dare to try, create something new (III)*	*Increasing entrepreneurship, shaping a realistic attitude, taking responsibility, taking initiative*
	Lifestyle	
	Gives a lot of self-importance, putting your own effort and your own contribution	

Table 2. Compilation of answers: What is entrepreneurship?

Next question was "What entrepreneurship education is?" in teachers', AB members' and HEI students' as well 6th graders' opinion. Students from 6th grade see that the case MiniMikkeli is entrepreneurship education. They do not have a broader perspective on it. Conceptual delusion, misunderstanding is very understandable. Perhaps most importantly, the ideas of teachers, AB members and HEI students raised perspectives on entrepreneurship education.

It can be said that the core message of entrepreneurship education rises strongly from the responses of teachers, AB members and HEI students. Entrepreneurship in teaching is much more than just starting a business. It is the strengthening of self-esteem, the development of

working life skills, the strengthening of an entrepreneurial attitude, the promise to do things differently, support for self-employment, etc. See table 3.

Teachers', AB members' and HEI students' opinions total of 22 respondents	**Thoughts from 6th grade students based on feedback from teachers, AB members and HEI students'**
Work life education, review of work life skills	*Entrepreneurship is being made more accessible*
Emphasizing the importance of one's own role, encouraging participation	*MiniMikkeli acquired its own sponsors, made promotional videos, calculated costs, and was able to operate independently*
Introducing entrepreneurship, teaching about entrepreneurship, raising entrepreneurship issues	*In MiniMikkeli, entrepreneurship is presented in a fun way, and doing things was the most important thing*
Strengthening an entrepreneurial attitude, modifying attitudes	
Supporting the strengthening of the imagination	
How society works, why taxes are paid, what everyone in society does	
Encouragement to become an entrepreneur or to be self-employed	
About starting a business, teaching about business, supporting business-oriented ideas	
Taking action. Completion of things. Perseverance. Planning. Creativity. Both error and failure develop. Planning your own activities.	
The teacher should be an enabler, an advocate for entrepreneurship issues	
Encouraging the ability to act independently	
Experimenting with being an entrepreneur	
Education as an entrepreneur	
Encouraging self-improvement	
Emphasizing the importance of your own contribution	
The teacher gives the student permission to take responsibility for their own learning	

Table 3. Compilation of answers: what is entrepreneurship education?

Table 4 is a compilation of the answers and opinions of the teachers, AB members and HEI students as well 6th graders to the question "How has MiniMikkeli influenced the development of basic education in 6th grade?". It is good to see that teachers and HEI members recommend that experiential entrepreneurship education should be done locally in and outside the school environment in collaboration with companies and remember that playfulness is important. In addition, collaboration with different schools and classes is important - more interaction and collaboration skills, engaging in teamwork between classes and between teachers is at the center of the discussion. In addition, it is recommended to use digitalization, a virtual learning environment part of EEE, virtual money is needed so that learning how to use money would be easier. It is especially noted that EEE must be a longer experience, not only one event (MiniMikkeli, fairs etc.), a part of the school curriculum and a part of the city's strategy so that resources and continuing development are possible. Teachers' attitude should change and become more entrepreneurial so that new companies, start-ups are established. Respondents raise the idea that it is important to accept/use hidden know-how and to use the potential that these children and young people have. Encouraging quieter people to shine is important. HEI students argued they got good practice in: coaching, inspiring entrepreneurship and supporting quieter children, knowledge of uncertainty, skills of leading a larger group, teamwork experience, working under pressure, good working life

experience, good social networks, tools for problem solving, opportunity for collaboration, project management skills. They also mentioned that it is important that MiniMikkeli be a part of HEI studies and provide the possibilities to have a foot in the door to jobs (ideas for working life, job opportunities). Students from 6th grade shared their ideas about MiniMikkeli: "new friends should meet/see, more start own business is asked to add to the EEE process and were inspired of applying for a job. In addition, the respondents suggested that there should be more emphasis on sales, networking, presentation, marketing and communication skills as well as making your own marketing material, developing entrepreneurial skills, understanding tax payments and how society works should be included in the EEE process. Students noticed *"Entrepreneurial skills are important in life, it's great to have learned it now!".*

Teachers', AB members' and HEI students' opinions (total of 24 respondents)		**Thoughts from 6th grade students based on feedback from teachers, AB members and HEI students'**
Recommendations for the development of entrepreneurial and social skills in 6 grades by teachers and AB members influenced MiniMikkeli	HEI students' opinions on development	Summary of 6th graders opinions
Bringing an entrepreneurial and employee perspective, locality and playfulness very important.	*HEI students' role of coaching entrepreneurship in 6th grade was important. Good practice of coaching, part of studies, good working life experience*	*The event (actual MiniMikkeli day) is important and concrete – expected - but disappointing when it came to being virtualized*
It is necessary to combine companies and entrepreneurs, the customer perspective, visits to companies, to schools and school visits to companies - close co-operation with existing companies	*Common learning environment: for 6th graders, HEI students - a good opportunity for collaboration, learning across, learning boundaries*	*New friends come when you get away from just doing things with your own class - getting to know each other, networking, doing new things, variation. For those who are shy - crossing the threshold - I can, I can, talk to the unknown. Friends from several schools - develop social skills.*
Must also include digitalisation or digital business game. On the other hand, the physical event is important in terms of networking, developing social skills, working in a new place, working with a new group, and increasing collaboration.	*HEI students went through all six classes. The business ideas were heard, the children met, the students' business ideas were sparred, they were further processed. Supported the realization of the event, the arrangements, the entire production of the event. Well intertwined into HEI studies (e.g. internship or projection studies)*	*Functionality and doing, starting your own business. The presentation of the company was the best. Got an idea and do it myself. Working together with a new group. I also got to know other companies.*
Curriculum integration is important. MiniMikkeli must not be just one actual event, it but must involve tasks that are done at the school. Brings a more long-term development approach. One event alone is not the whole of entrepreneurship	*I did my last internship at MiniMikkeli. Scheduling, working under pressure became a good work experience. I was given a snack to get involved in my current job.*	*Should include more about entrepreneurship (starting a business, finance, sales), time to present your own business idea, starting a business, running a business in school. Social skills and performance skills are needed, learning about working.*

education. MiniMikkeli alone must not undermine the whole development of entrepreneurship education in schools. Entrepreneurship education should be a process that starts in primary school and progresses step by step. One culmination may be the MiniMikkeli.		
The schools' own Business Fairs are one way of implementing entrepreneurship education. But they should include, for example, making promotional videos about your own company. There should also be a presentation of ideas in the "Cave of the Lion". Acquisition of sponsorship routes for own companies e.g. initial capital for own operations. Teaching should guide and encourage the creation of original creative ideas. Not just cafes.	*HEI students play an important role in inspiring 6th graders to be entrepreneurial, brainstorming, experimenting, bold opening, encouraging, supporting quieter students.*	*Applying for a job - an insight, this is no easy thing to do. The quietest burst into bloom when they were allowed to pull on the doctor's coat. Positive learning experience. Moments of success.*
Virtual money should be added to. MiniMikkeli to learn about the value of money	*I work in a job that is much the same as entrepreneurship. The team must be trusted, the risk assessment must be in order. Teamwork is emphasized. I learned from MiniMikkeli for myself. Pressure resistance developed. I got knowledge, uncertainty. Didn't always know what was coming and the same now.*	*I want to present my business idea on the school' s own business day - a lion cave*
If teachers work in a teacher-led way, according to the old school, then there is no need to wait for entrepreneurship to increase in Finland.	*The skills of leading a larger group, under pressure, enduring haste, holding many wires in their hands developed.*	*Doing, owning a company, performing, making new friends, teamwork, teamwork - this is cool, I want to be an entrepreneur*
Hidden know-how must be made available. We cannot afford to lose the potential found in these children and young people. Encouraging quieter people to shine is important.	*Networking skills, project management skills, holistic situation management skills - Can be used later in working life.*	*Sales skills, networking, presentation skills, marketing and communication skills, making your own marketing materials, developing entrepreneurial skills, understanding of tax payment and society increased*
Collaboration with different schools and classes is important - more interaction and collaboration skills. You need to learn to do teamwork between classes and between teachers.	*Creating social networks, my team works responsibly. I let my team act creatively and responsibly, risk management and failure are ok.*	*Being overwhelmed, moving out of one's comfort zone, performing skills has been, has had to think about visuals, has had to calculate budgets, has had to write, draw, use a computer, has had permission to use the imagination.*
It is important that the companies of the 6th grade students appear either in MiniMikkeli or at the schools' own trade fairs. There must be learning to run the skills involved in running your own business.	*Tools for problem solving came, had to adapt very quickly to the moment. The same concept did not work in every situation.*	*Sometimes it was boring when the same thing was done many times, but MiniMikkeli was great - got to introduce own company*

Supporting entrepreneurship should be a process - not just one event at MiniMikkeli. Must be linked to the curriculum e.g. interdisciplinary studies or social studies and on the other hand mathematics (eg budget), visual arts (eg logo design), Finnish (eg pitching a business idea), information technology (eg making a promotional video), languages (eg company presentation in different languages), etc. Experiential learning encouraging!	*Project management skills developed tremendously.*	*Entrepreneurial skills are important in life, it's great to have learned it now!*
Doing, participating, implementing, working with your own idea, getting to know jobs both at the actual MiniMikkeli event and at the school. Provided tools for teachers on how to collaborate with other age groups to support entrepreneurship education.	*I got to visit companies - I got my foot in the door to jobs so I have an opportunity to get a job for myself.*	
The work done makes it easier for grades 7-9 to get to work and apply for jobs during the introductory periods. Having a NY course in grade 9 in a school or some other entrepreneurship training in grade 9 can affect behaviour, so that even a young person for whom entrepreneurship would not appear as an alternative may be encouraged to try entrepreneurship.		
Entrepreneurship education should be part of the city's strategy. My own behaviour can change, I can be more active in taking a stand on business policy goals. I can make recommendations for increasing entrepreneurship education in primary schools. Long-term support for the business environment is important. What can we do already in primary schools?		

Table 4. Compilation of answers: How has MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education?

Summary and recommendation for the future research

In this case study I started from the European level to understand the dilemma of developing entrepreneurial education and its effect on entrepreneurship and working life skills in the education system. Next, I mirrored previous studies on entrepreneurship education, entrepreneurial mindsets, skills, attitudes and behaviours. I also referred to several researchers who studied experiential entrepreneurial education on experiential entrepreneurship education, so as to widen the understanding of the role that experiential entrepreneurship education plays in the education system. As a method I used case study research and the focus was on developmental evaluation.

In this case study, I focused on an experiential entrepreneurship education (EEE) process in basic education 6th grade (age 11-13) and Higher Education (HEI) in Finland. EEE builds a bridge to future entrepreneurial experiences and increases entrepreneurial self-efficacy by connecting ambiguity in social and professional uncertainties contained in markets and the future. In this study I also used 'Developmental Evaluation' (DE). The idea of DE is to support the innovation (e.g. projects, programs, products, organizational changes, policy reforms or system interventions) of the development process. DE can include evaluative questions and logic and gathers real time data to inform about an ongoing process. The evaluator is part of a program design team or management team. Their function in the team is to: lead, support discussions with evaluative questions, reflect, monitor data, and facilitate systematic data-based reflection and decision making within the DE. They participate in deciding and facilitating discussions about how to evaluate and what is happening. All team members interpret evaluation findings, analyze implications and apply results to the next stage of development. They become involved in improving interventions and helping to develop activities for the program's future.

The EEE process, which was the subject of the evaluation, was called the case 'MiniMikkeli'. It was the EEE process for basic education teaching in grade 6 and HEI education. Main idea in the EEE process, case MiniMikkeli is to test, to feel, to play, to get experience of working life, entrepreneurship. The case MiniMikkeli is an experiential entrepreneurship education process, in which, entrepreneurial actions, start-up own business (JA Junior Achievement, Pikku-Yrittäjät) and working life skill elements are included. The case MiniMikkeli EEE process – basic education 6th grades meet HEI and business. The process takes the whole school year from August to May. The Case MiniMikkeli is part of Mikkeli basic education 6th grade curriculum: Students working life and entrepreneurship as well as an integrated part of the HEI studies: volunteer, project studies or internship. The developmental evaluation case study data was collected using questionnaires (via webropol) and semi-structured interviews (via teams), as well as observations throughout the EEE

process. The study covered the years 2016, 2017, 2018 and 2019. The main research questions are: 1. How has the case MiniMikkeli influenced the development of basic education 6th grade and HEI experiential entrepreneurship education in respondents' opinion? and 2. Is included in the case MiniMikkeli experiential entrepreneurship education both in basic education 6th grade and higher education (so that in long term the teaching influences students' entrepreneurial behaviours, attributes and skills as well mindsets and attitude)?

In addition, I wanted to understand and try to find answers to the questions: How, Entrepreneurship Skills and Competencies, have developed with the case MiniMikkeli? How the attributes associated with entrepreneurship changed with the case MiniMikkeli? Has the case MiniMikkeli influenced on Entrepreneurial behaviour? As well my sub-questions were: What entrepreneurship is? What entrepreneurship education is?

Continuous feedback was a prerequisite for development. The feedback, answers-and respondents' opinions were key elements and foundation for continuing developmental evaluation on the EEE process case MiniMikkeli.

In summary, the EEE process case MiniMikkeli was successful, important and effective, as well in teachers', AB members', HEI students', as 6th graders' opinion. It was highlighted that experiential entrepreneurship education be done locally in and outside schools in cooperation with companies and that playfulness is important. Collaboration with different schools, between classes and teams were mentioned. In addition, it was recommended to use digitalization, more virtual learning environments, virtual money as part of EEE, virtual money is needed. Noteworthy is that EEE must be a longer experience, not only one event (MiniMikkeli, fairs etc.). It must be part of the school curriculum and part of the city's strategy so that resources and continuing development are possible. Teachers' attitudes should be more entrepreneurial so that new companies, start-ups are established. Respondents raised the issue that it is important to accept/use hidden know-how and use the potential that these children and young people have. Encouraging quieter people to shine is important. HEI students argued they got good practice in coaching, inspiring entrepreneurship and supporting quieter students/children, knowledge of uncertainty, skills of leading a larger group, teamwork experience, working under pressure, good working life experience, good social networks, tools for problem solving, opportunity for collaboration, project management skills. HEI students also raised the issue that it is important that (MiniMikkeli) is part of HEI studies, be well intertwined into HEI studies and provide the possibilities to have a foot in the door to jobs (ideas for working life, job opportunities). Students from 6th grade were expecting to make new friends and more studies of start own business during the EEE process and they were also inspired of applying for a job. In

addition, the respondents suggested that there should be more opportunities to emphasis on sales, networking, presentation, marketing and communication skills as well as making your own marketing material, developing entrepreneurial skills, understanding tax payments and how society works should be included in the EEE process. Students from 6th grade noticed *"Entrepreneurial skills are important in life, it's great to have learned it now!".*

The main weakness of this case study was the small number of respondents. It is almost impossible to make large-scale generalizations based on the data. On the other hand, the case MiniMikkeli is a very interesting and constantly evolving research subject. The experiential entrepreneurship education work done in the education system has a clear impact on students 'entrepreneurial and working life skills. The best in this study was the developmental evaluation of an experiential entrepreneurship education case. DE is in constant development and EEE is meaningful work in support of working life and entrepreneurial skills.

The next step in this case study could be, for example, to find out, as a comparative case study, what the differences and similarities are between the 6th graders and HEI students in 2016, 2017, 2019 and the current case MiniMikkeli 2021 and 2022 concerning the main research questions.

My contribution to this research was to present new perspectives and solutions on how to develop and evaluate experiential entrepreneurship education process in basic education 6th grade and higher education, so as to see the possible effect entrepreneurial mindsets, attitudes and skills in order to influence entrepreneurial behaviour, entrepreneurship and self-employability. The framework of the study was built around Entrepreneurial Behaviours, Attributes and Skills.

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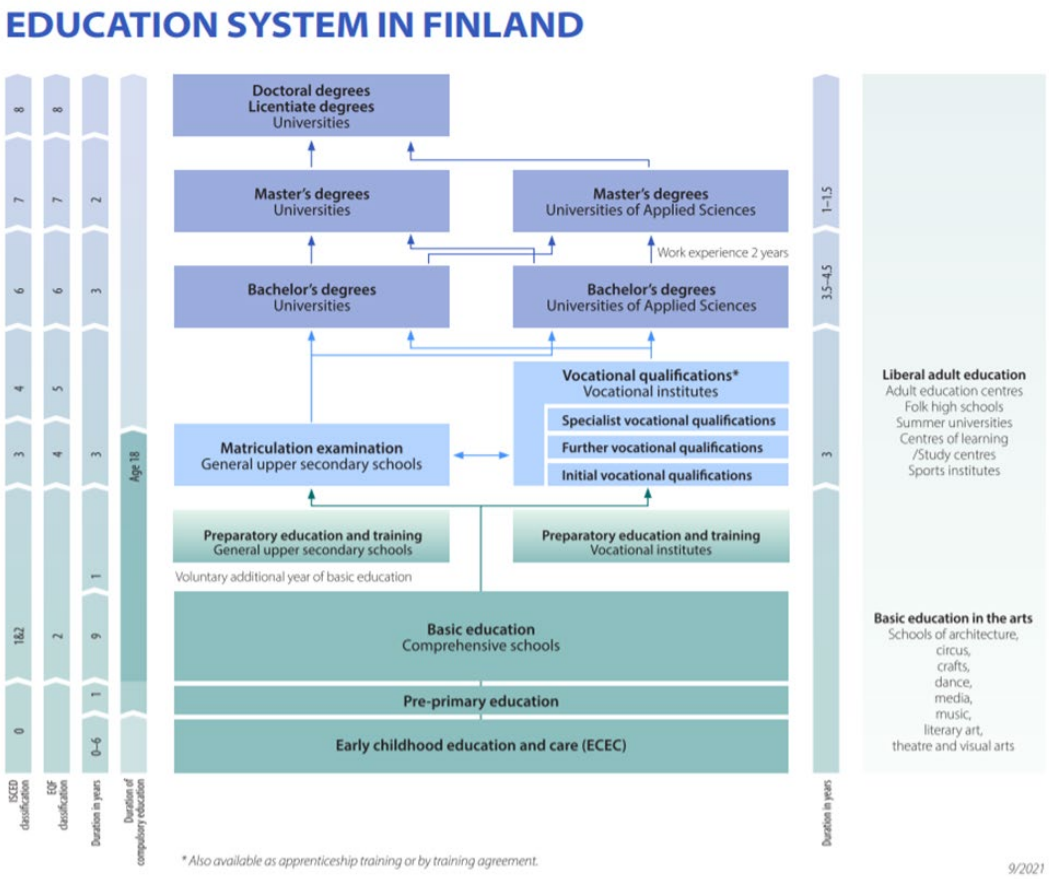
Appendix 1. Education System in Finland

https://okm.fi/documents/1410845/15514014/Education+system+in+Finland/7c5a920b-47a5-c3ce-cbca-818ff3a5f848/Education+system+in+Finland.pdf?t=1631015290321

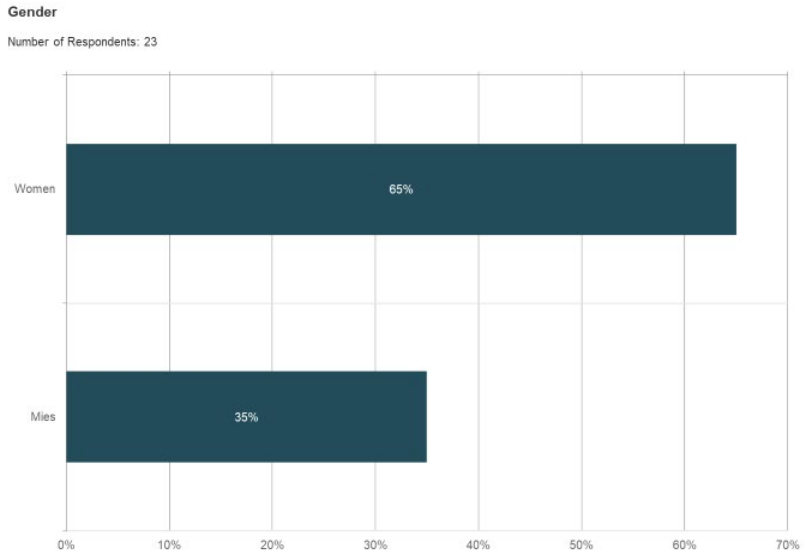
The Finnish Education system

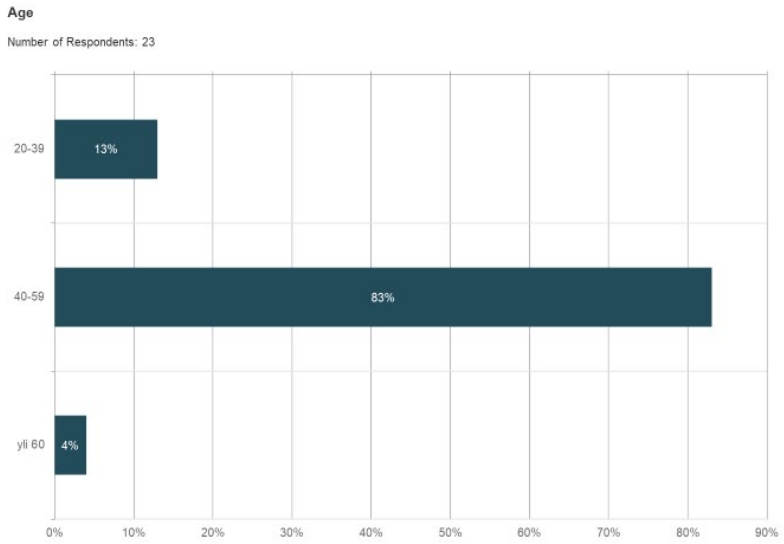
The Finnish Education system

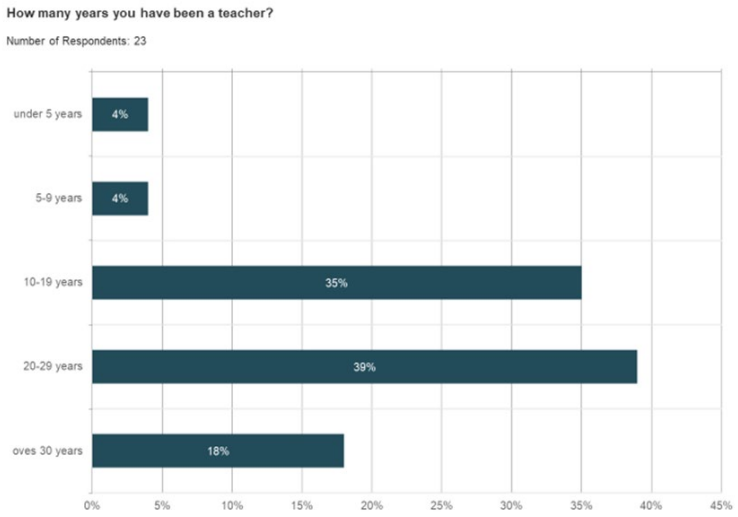
The Finnish education system consists of early childhood education and care which is provided for children before the compulsory education begins, pre-primary education which is provided for children in the year preceding the beginning of compulsory education, nine-year basic education (comprehensive school), which is compulsory, upper secondary education, which is either general upper secondary education or vocational education and training, and higher education provided by universities and universities of applied sciences. Furthermore, adult education is available at all levels (https://okm.fi/en/education-system). See picture 1. the Finnish education system below.



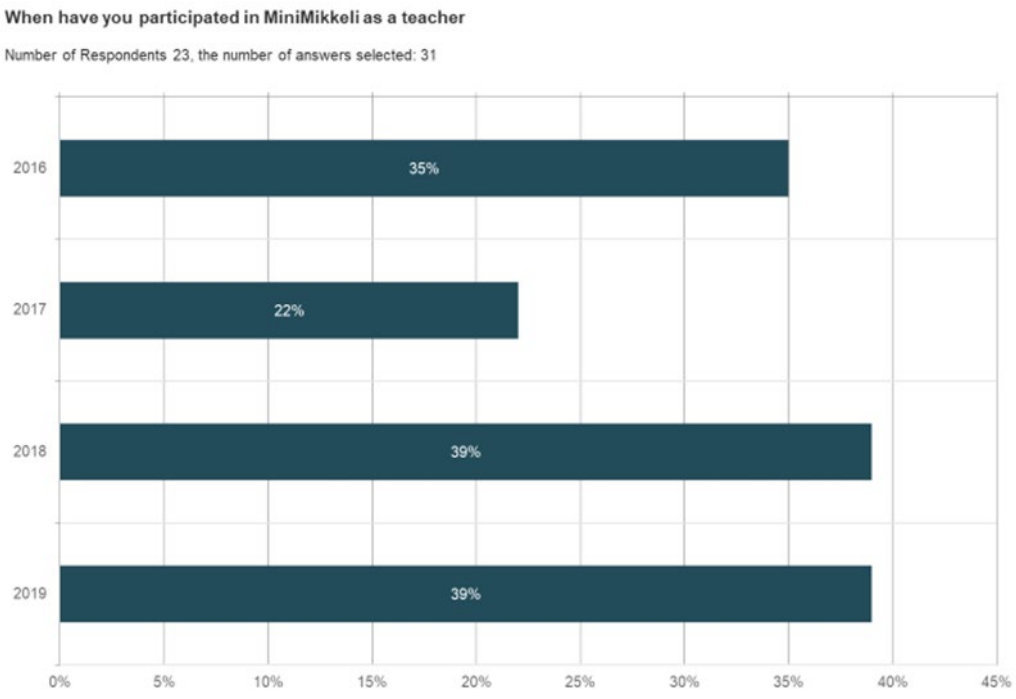
Appendix 2. The Gender, the Age and How many years you have been a teacher of Respondents







Appendix 3. When have you participated in MiniMikkeli as a teacher?


When have you participated in MiniMikkeli as a teacher
Number of Respondents 23, the number of answers selected: 31
2016
35%
2017
22%
2018
39%
2019
39%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%

Appendix. 3. The Development of Entrepreneurial Skills and Competences

Theme: How Entrepreneurship Skills and Competencies have developed with MiniMikkeli Number of Respondents: 23							
	Fully disagree	**Somewhat disagree**	**Don't know**	**Somewhat agree**	**Fully agree**	**Average**	**Median**
MiniMikkeli's measures have helped to develop strategic thinking	8,70 %	17,39 %	30,43 %	39,13 %	4,35 %	3,13	3
MiniMikkeli has provided tools for creative problem solving	4,35 %	8,69 %	39,13 %	43,48 %	4,35 %	3,35	3
MiniMikkeli has developed the ability to act based on intuition in uncertain situations	8,69 %	21,74 %	39,13 %	26,09 %	4,35 %	2,96	3
MiniMikkeli has developed skills in making proposals	4,35 %	8,69 %	21,74 %	**56,52 %**	8,70 %	3,57	4
MiniMikkeli has developed persuasion and persuasion skills	4,35 %	21,74 %	30,43 %	39,13 %	4,35 %	3,17	3
MiniMikkeli has developed project management skills	4,35 %	17,39 %	13,04 %	**60,87 %**	4,35 %	3,43	4
MiniMikkeli has developed comprehensive situation management skills	8,70 %	13,04 %	43,48 %	30,43 %	4,35 %	3,09	3
MiniMikkeli has developed networking skills	8,69 %	21,74 %	21,74 %	43,48 %	4,35 %	3,13	3

Appendix 4. The Development of attributes related to Entrepreneurship with MiniMikkeli

How the attributes associated with entrepreneurship changed with MiniMikkeli? Number of Respondents: 23							
	Fully disagree	**Somewhat disagree**	**Don't know**	**Somewhat agree**	**Fully agree**	**Average**	**Median**
Ambition and purposefulness have increased	0 %	21,74 %	34,78 %	34,78 %	8,70 %	3,30	3
Self-awareness and self-esteem have increased	0 %	13,04 %	43,48 %	34,78 %	8,70 %	3,39	3
Perseverance has strengthened	4,35 %	17,39 %	21,74 %	47,83 %	8,69 %	3,39	4
Operational orientation has increased	4,35 %	13,04 %	21,74 %	52,17 %	8,70 %	3,48	4
Learning by doing has increased	0 %	8,69 %	8,70 %	**73,91 %**	8,70 %	3,83	4
Creativity has increased	4,35 %	17,39 %	13,04 %	56,52 %	8,70 %	3,48	4
Determination has increased	0 %	17,39 %	47,83 %	26,09 %	8,69 %	3,26	3
Diligence has increased	4,35 %	30,43 %	26,09 %	30,43 %	8,70 %	3,09	3
Entrepreneurial activity has increased	4,35 %	21,74 %	17,39 %	43,48 %	13,04 %	3,39	4
Participative and active citizenship has increased	0 %	8,69 %	43,48 %	39,13 %	8,70 %	3,48	3
Creativity and innovation have increased	4,35 %	21,74 %	17,39 %	43,48 %	13,04 %	3,39	4
A positive entrepreneurial culture has increased	8,70 %	4,35 %	21,74 %	52,17 %	13,04 %	3,57	4
A positive attitude towards entrepreneurship has increased	4,35 %	8,70 %	30,43 %	43,48 %	13,04 %	3,52	4
Self-awareness has evolved	9,09 %	31,82 %	22,73 %	27,27 %	9,09 %	2,95	3
The ability to take responsibility has developed	4,35 %	30,44 %	17,39 %	34,78 %	13,04 %	3,22	3
The ability to take responsibility has developed	0 %	13,05 %	13,04 %	56,52 %	17,39 %	3,78	4
Project work skills have been developed	0 %	17,39 %	4,35 %	**60,87 %**	17,39 %	3,78	4
Getting to know entrepreneurship has become more	8,69 %	4,35 %	8,70 %	56,52 %	21,74 %	3,78	4

Appendix 5. The case MiniMikkeli influence on Entrepreneurial Behaviour

Has MiniMikkeli influenced the behaviour to start a business? Number of Respondents: 23							
	Fully disagree	**Somewhat disagree**	**Don't know**	**Somewhat agree**	**Fully agree**	**Average**	**Median**
The understanding of the business plan has developed	4,35 %	13,04 %	17,39 %	**56,52 %**	8,70 %	3,52	4
Interpretation skills in the income statement and balance sheet have developed	**21,74 %**	**34,78 %**	26,09 %	13,04 %	4,35 %	2,43	2
The understanding of the relevance of business expertise as a basis for job search on the one hand and business on the other has increased	8,70 %	30,43 %	17,39 %	39,13 %	4,35 %	3,00	3
The importance of understanding the business as a whole has increased	4,35 %	26,09 %	13,04 %	43,48 %	13,04 %	3,35	4
The competence to apply business expertise has increased	8,69 %	47,83 %	26,09 %	13,04 %	4,35 %	2,57	2
Understanding that the business competence is part of general working life skills has increased	4,35 %	17,39 %	30,43 %	43,48 %	4,35 %	3,26	3
Marketing and sales expertise has been developed	4,35 %	21,74 %	21,74 %	34,78 %	17,39 %	3,39	4
Marketing and sales skills are part of working life and entrepreneurial skills	4,35 %	13,04 %	26,09 %	**47,83 %**	8,69 %	3,43	4
Starting a new business is easier	8,70 %	21,74 %	39,13 %	17,39 %	13,04 %	3,04	3
Business cooperation is easier	4,35 %	13,04 %	30,43 %	43,48 %	8,70 %	3,39	4
It is easier to talk about changes of business ownership	**26,08 %**	**39,13 %**	26,09 %	4,35 %	4,35 %	2,22	2
It is easier to talk about business ownership changes and link them to teaching	**30,43 %**	**39,13 %**	21,74 %	4,35 %	4,35 %	2,13	2

How ambidexterity and governance interact for Business Model Innovation in family firms: A process view

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INTRODUCTION

Over the last few years organizational ambidexterity has attracted a growing attention in family business research. Ambidexterity enables firms to enhance their performance and competitiveness and refers to the firms' capability to exploit current abilities and resources, while simultaneously exploring and integrating new competences (Gibson & Birkinshaw, 2004; He & Wong, 2004; O'Reilly & Tushman, 2011; Raisch & Birkinshaw, 2008). An increasing body of literature recognizes ambidexterity as a key driver to continuously nurture innovation processes and also to develop organisational capabilities which enable business model innovation (Khanagha et al., 2014; Ricciardi, Zardini & Rossignoli, 2016; Teece, 2018). However, significant gaps in its theoretical understanding still remain (Allison et al., 2014). The nexus with governance processes was substantially neglected by previous studies, although it is crucial for understanding the distinctiveness of family firms' behaviour and the heterogeneity of their performance (Stubner et al., 2012).

We adopt a process perspective to investigate how and why ambidexterity and governance interact in the flow of the entrepreneurial process (Hjorth et al., 2015; Langley, 1999) and influence business model innovation. This research focuses on the iteration, over time, of the intentions and behavior that unfold in the entrepreneurial process and deep delves into the interplay of ambidexterity and governance processes. We challenge traditional one-way perspectives and investigate the mutual conditioning and adaptation that leads, along the entrepreneurial process of the family firm, to the

ability to innovate the firm's business model.

Finally, we overcome approaches that conceptualize the family governance as monolithic. According to Kammerlander et al (2020), family membership diversity has different effects on firms' decisions to pursue exploration versus exploitation activities. Therefore, we investigated the variety and differences in behaviour and goals that characterize individually the family members involved in governance processes.

THEORETICAL FRAMEWORK

Organizational ambidexterity refers to the simultaneous pursuit of exploratory and exploitative innovation by firms (Raisch & Birkinshaw, 2008) and recent research pointed out its positive linkage with above average performance, especially in family firms (Moss et al, 2014). The conflicting demands of ambidexterity are most relevant in family firms, since they need to balance tradition with innovation and renewal (Miller and Le Breton-Miller, 2005). Previous research found that not all family firms will be equally proficient in simultaneously pursuing exploration and exploitation to a high level (Bammens, Notelaers, & Van Gils, 2014; Carney, 2005; Cassia et al., 2012; Kollmann & Stöckmann, 2014; König et al., 2013; Lubatkin, Simsek, Ling, & Veiga, 2006; Moss, Payne, & Moore, 2014).

A central trait in managing ambidexterity is the possession of prior related knowledge in order to assimilate and use new knowledge. An organization takes advantage from individuals with a breadth of prior knowledge in multiple categories as well as various linkages across these categories, which makes organizations better prepared to take on both exploitation and exploration. This requirement is very significant in family firms that have been handing down knowledge rooted in tradition for generations, but which also represents a resource that can be mobilised to undertake new paths of innovation. Family control of ownership, management and governance provides the ability to shape organizational ambidexterity through their power and legitimacy, as well as through resources (Chrisman et al., 2012, Dyer, 2006). Therefore, family governance represents a fundamental trigger to unlock and enhance traditional knowledge in alternative uses by pursuing ambidextrous strategies that can facilitate business model innovation.

METHODS

This research was carried out, through a process perspective, to investigate how and why the

interaction between family governance and ambidexterity affects a firm's capability to innovate its business model. We analyzed, by means of a single case study (Chetty, 1996; Yin, 2009), how the interaction unfolds over time and produces mutually adaptive effects on governance and ambidexterity. The research site was a fourth-generation family firm engaged in the manufacturing of traditional food products strongly rooted in the culture of a local area. It is situated in a small village and is closely integrated into the social and economic environment.

To answer our research question, we adopt a process research approach and investigate how BM innovation is realized through sequences of events (Langley, 1999; Tsoukas and Chia, 2002). We deployed longitudinal research to depict the evolution of actual processes in their natural environment. Furthermore, our open and iterative approach to data collection and analysis enables us to explore and refine our conceptualization of process dynamics (Strauss, 1987).

Entering the field, the aim of this research was to advance our theoretical understanding of the linkage between ambidexterity and governance processes in family firms. We were also interested in understanding how the reciprocal interaction over time leads to business model innovation and to a renewed balance in corporate governance, as the extant research was very limited so far. In selecting the research site, we focused on an exemplary process of introducing ambidextrous strategies intertwined with the evolution of family governance. We were able to observe the process as it unfolded and accessed a wealth of data from a variety of sources. At the end of our research, we could observe how the implementation of ambidextrous strategies has led to an innovation of the business model and has favored a coherent and connected adaptation of family governance. (Siggelkow, 2007), also consistent with the aim of theoretical generalization that can be achieved by the single case study method (Tsang, 2014). Especially relevant, we were able to interview Directors, managers and other informants involved in the investigated process. Family members involved in governance roles and in the running of the business, as well non-family managers from different hierarchical levels were repeatedly interviewed over time with the aim of identifying micro-changes resulting into the design and implementation of ambidextrous strategies leading to business model innovation and the effect of variations in the firm's ecosystem. We found a high likelihood that events and information remained vivid in the minds of our informants. Therefore, according to guidelines for rigorous qualitative research, we considered the single case study as appropriate for carrying out this research (Yin 2003; Siggelkow, 2007; Tsang 2014).

The investigated firm was selected because it offered an excellent setting for exploring how the Board interacts with BMI. When the study began, the Board was the main actor holding strategic roles and

the prevalence of the Directors were also exerting key operational roles. As the research unfolded, we learned that NG provided a context for longitudinally exploring how the ways of dialogue and interaction between the Directors influence the process of business model innovation through the development of dynamic capabilities. We decided to focus on the role of the board in the process of creating dynamic capabilities that enable business model innovation because the extant literature showed that only limited knowledge existed on the topic

Data collection.

The data from this research was collected through semi-structured interviews (Easterby-Smith et al., 2018) with directors, investors and other partners, experts, as well as from secondary sources such as company website, annual reports, media accounts, industry publications. To test and refine our interview questions, we first contacted two Directors from two differing start up companies that were not involved in this research and we interviewed them separately in approximately 45 minutes one-to-one meetings. We then reviewed our questions in a following meeting with the Board chairman and the CEO of our research site and modified them in light of the comments and suggestions received. Following the revised guide we conducted 38 interviews (See Table 1) separately with Directors and other informants such as suppliers, investors, CEO of differing start up companies, not involved in the research, but with network relationships with the investigated company to yield a more accurate analysis and to represent differing views (Yin 2003).

The first interviews were conducted with the Chairman of the Board, who was also the leader of the Family Council. He gave us an overview of how the business was run, the role of the family in the governance and the business. He also provided information on the most recent events that influenced the business model and the governance processes. Such interviews allowed to gather the first information on the firm, the organization and strategies. They provided the basis for recognizing subsequent changes over time potentially enabled by ambidexterity and family governance .

We then investigated how and why ambidextrous strategies were undertaken and how they interacted with governance processes. For this purpose, we interviewed top and middle managers with long experience in the company and with direct knowledge of the events. We also interviewed other informants to complete, clarify and verify the information. Data collection through interviews started in April 2016 and was carried on until December 2021.

Table 1: Data collection - Interviews

Research participant	**Number of interviews**
Chairman of the Board	3
Family Director 1	2
Family Director 2	2
General Manager	4
Family Sr Manager (GV)	5
Family Sr manager (MV)	4
HR Manager	5
CFO	2
Marketing Manager	2
Commercial officers (No.3)	6
Quality Manager	2
Management Accounting Officer	2

Interviews were conducted during several formal and informal meetings having an average length of 1 hour and 20 minutes. They were audio-recorded and transcribed after each meeting, within 24 hours. Moreover, firm and industry-level information were gathered. Different data collection strategies and different sources of data were employed to ensure construct validity (Gibbert and Ruigrock 2010; Gibbert, Ruigrock and Wicki, 2008; Tracy 2010).

Secondary sources allowed to build longitudinal accounts allowing us to identify critical events, potential links and contribute to build up a description of the investigated phenomena. Therefore, the variety of the employed data sources provided a rich and robust foundation for theory development.

Data analysis.

Data analysis was guided by theoretical concepts regarding both the ambidexterity, governance process and business model innovation in family firms theories in an iterative cycle of analytic induction and deduction. As collected, data were inductively analyzed, closely following the guidelines for qualitative inquiry, including the techniques for iterative comparison of data and emerging data structure.

Data collected by interviews were triangulated among respondents and, then, with information from secondary sources, such as published and unpublished documents (Gibbert, Ruigrock and Wicki, 2008). Data were stored in a data base specifically designed for the task of structuring and clarifying information and then we recursively iterated between data and theoretical constructs. Techniques of open and axial coding were used for data analysis (Locke, 2001). As we began the analysis, we identified initial concepts emerging from the collected data by a careful examination and comparison and then we grouped them into categories (Bailey and Peck, 2013). Finally the themes were organized

under higher level constructs that allow the development of the conceptual framework of this research.

To ensure reliability we turned to peer debriefing and we employed several formal and informal meetings with colleagues to verify the methods employed and the resulting patterns.

Findings result from the collected data, but they are the outcome of the interaction with the extant literature. The level of abstraction was achieved during the analysis, and each time we moved forward into emerging theoretical constructs, we then went back through the data to maintain consistency and to confirm or refine our ideas if required (Brown & Eisenhardt 1997).

FINDINGS

Research site

The investigated firm was a family business established in the mid-1920s in a small town in northern Italy and engaged in the production of cured meats and foodstuffs typical of the local area. The firm is a leader in the domestic market and also strongly rooted in the main foreign markets, especially in the United States, and exports its products to many countries around the world.

The firm currently holds seven production sites specialising in the manufacturing of the different products. Recently, it has invested approximately 40 million euros in expanding production capacity, improving quality and innovating production processes, with a focus on internal efficiency and the cold chain. The most recently built production site is equipped with advanced industrial automation technology and has also become a logistics hub. It has an automated warehouse capable of constantly monitoring refrigeration and the management of expiry dates and stocks. Another major focus of investment and innovation in recent years has been traceability and safety, enabling risk analysis and control at every stage of the production process. The firm has closely integrated its Quality Assurance and R&D departments. Product innovations are driven by commercial feedback and analysis of consumer trends. the firm has set up working groups to promote product innovations, which are then reviewed and evaluated before implementation.

The integration between corporate governance and ambidexterity.

This study goes deep into the black box of family governance and investigates how and why the intentions and behaviour of family members with governance and managerial roles, as well as their interaction and balances are related with the ability to develop activities to exploit existing resources

and, simultaneously, to explore new entrepreneurial opportunities leading to business model innovation.

Family governance before the launch of ambidextrous strategies.

This research investigated how and why the governance of a family firm interacts with new ambidextrous business ventures. Since we adopted a process perspective, our study allowed us to identify the mutual interaction through purposive behaviours that changed the firm's business model and its governance processes over time.

Before starting ambidextrous strategies, the investigated company, with the fantasy name Vercor, was led by a President, named FV, belonging to the controlled family who was recognised as the leader of the company and of the family pact that unites all the members of the different family branches that hold the ownership of the company. Some family members have operational and governance roles in the company, but most of them are external to governance and management. The controlling family holds 100% ownership of the company and almost all of its subsidiaries. On the board of Vercor all the directors belong to the controlling family, but two do not have management responsibilities.

As it is now in its fourth generation after almost one hundred years of history, the number of family members holding ownership is high (19 people), the Family Board constitutes a body that integrates and balances family expectations and tensions, protecting the management of the firm and preserving family cohesion. Data show that, in this way, discussions between family members are addressed and resolved outside the company. At the same time, the Family Council organizes activities and meetings that promote family continuity and cohesion and manages the economic benefits that are provided to family members.

In running the business, the President is supported by his two sons, MV and GV. They have responsibility for specific organizational functions but discuss and participate together in the most important strategic decisions. In addition, they maintain responsibility for the most critical activities for the business including, for example, the purchase of raw material from suppliers in the supply market. Due to the importance of the raw material on the quality of the final product and production planning as well as the value of the raw material cost on the turnover, this activity is not delegated to managers outside the family.

The data collected show that, at the time our study began, generational succession was a topic considered by family members, but without any timeframe or it was not considered necessary to

formally plan it. The change in leadership of the President was not considered an urgent topic, but an event that would occur in the coming years.

Over time, the company recruited non-family managers with a top position in the hierarchy. Growth in size has required the acquisition of managerial skills and expertise and the recruitment of managers from outside the family has created an organisation in which there are both family members and non-family senior managers. The hierarchy is flat and managers who lead functions are accountable to family members. Inter-functional collaboration among non-family managers is low, as each of them tends to try to relate to the president or MV or GV, depending on their areas of responsibility. The family is considered the ultimate decision-maker for any relevant choice.

The firm is an important component of the community in which it is located. It is one of the best known and largest companies in the town where it is located and almost all of its employees live in that town. Its long history makes it an identifying element of the community and, for this reason too, the possibility of relating within the company directly with family members is considered important and rewarding for employees.

Family governance attaches great importance and cherishes traditional values in the firm's activities. They are considered a guarantee of distinctive quality for the products and a key requirement in the choices of change and innovation. Traditional values constitute an element of identity for the organisation and are strongly recognised by employees. Commitment to the production of traditional food products, rootedness and connection with the local community, sense of belonging and loyalty in the organisation are considered key and identity elements by both family governance and non-family managers.

Family governance as a key element in turning towards exploration strategies.

We found that family governance plays a key role in encouraging or hindering the initiation of ambidextrous strategies. Given the existing and prospective balance in governance processes, the initiation of an ambidextrous strategy is only implemented if it is in line with and compatible with family governance and its balances. Therefore, ambidextrous strategies interact with family governance processes and balances.

In 2009, Vercor acquired a 20% stake in a delicatessen specialising in high-quality cured meat products, with a commitment to acquire the remaining 80% in the following years. The organisation of the acquired company included a number of managers with experience of international markets and knowledge of major distribution chains, particularly in the United States. The Chairman and his

two sons realised that the experience of the managers of the acquired company could be useful to strengthen the international expansion by favouring the entry into the US market. A working group was formed, in which the President, MV and GV together with the managers of the acquired company began to explore opportunities for entering the US market. GV said:

"We realised very early on that the managers of the company we were acquiring had skills and experience that we and our company lacked. Meeting and working with those managers could be the springboard for exploring new markets and, especially, the US market".

The working group examined the entry possibilities and constraints of the US health regulations for importing cold cuts. After several months of weighing up the pros and cons of possible alternative solutions, the most promising strategy appeared to be the establishment of a plant in the US to slice the sausage and sell the packaged trays to retail chains. This option required a change in the business model to focus the value proposition on service content. This solution allowed the shelf life of the product to be significantly extended, compared to exporting the packaged trays from Italy, and allowed the export of unsliced salami, simplifying US health compliance and logistics. Finally, the establishment of a processing plant in the United States would have facilitated commercial relations with US distribution chains. This project, although very interesting and promising for Vercor's growth in the United States, would have been a new experience. The company had never carried out initiatives of this type before, and there was no known similar behaviour by other competitors. It was therefore an initiative considered risky because of its high innovativeness, but also extremely interesting because of its commercial potential and the development of Vercor's organisational know-how. Moreover, it would have represented an innovation in Vercor's business model that, if successful, would have been replicable to more customers in the same market or could have been used to enter additional markets. In this regard MV said:

"We evaluated the advantages and disadvantages of the different solutions for several months and realised that we would have to shift the focus from selling the product to selling the product slicing service. The project therefore had to be set up differently from our previous business ventures, but it would allow us to simplify logistics and make it easier to comply with US health regulations. In addition, it would have allowed Vercor a very important innovation in its business model and how to enter foreign markets".

And FV said:

"The project was extremely ambitious and innovative and represented a major challenge not only for the company, but also for the family as they would take responsibility for it. We are convinced that the innovation of our company must be based on the pedestal of tradition and this project would allow us to provide our customers with the quality and freshness of our product as if they had bought it in our market and not after long transport times. So we decided to implement it.

The data shows that the initiation of the exploration strategy is intertwined with the governance processes. Although it responded to the strategic need to strengthen competitiveness and presence in foreign markets, this innovation in the business model was able to take place because a member of the family, eg. MV decided to take the leadership and use this project as a lever for the organisational and business model innovation of Vercor. In this regard, the Chairman said:

"In our company, important projects are overseen directly by a family member, so if no one could take charge, we would put the project on hold and wait for the right moment. This is not a lack of trust in our managers, but it is the family that exercises leadership and must therefore take responsibility for key initiatives themselves. Non-family managers might find it more difficult to make critical decisions with other managers, whereas no one would question the directives given by a family member".

Therefore, a first finding of our study is that, since exploration strategies determine a substantial or radical change in the company's business model, they are designed and implemented if they are coherent with governance balances and processes.

The mutual interaction of governance and ambidextrous strategies: towards business model innovation and new governance alignments

We found that family governance and ambidexterity mutually condition each other by determining adjustments in governance balances and practices to carry forward exploration choices and consolidating exploitation activities to strengthen the resilience and continuity of the family business. Choices assigning particular family members to run exploration and exploitation strategies, the content of exploration and exploitation activities, as well as the degree of innovativeness in designing business model changes are conditioned by the family governance balances deemed appropriate and

balanced and their evolution over time. In this perspective, the ability to successfully run initiatives pursuing new entrepreneurial opportunities may influence the leadership, authority and resulting power of individual members within the family governance. Uncertainties and critical issues arising from the need for leadership change in family governance can be resolved according to the emerging ability of family members to lead traditional versus more innovative activities depending on how crucial they are considered to the prospects for continuity and development of the family business. We found that the development of the processes that over time led to the implementation of the exploration strategy has had effects on the management of the family business that have resulted in a change in family governance. Moreover, it led to a change the leadership within the family governance. Consequently, these adaptations have changed the power relations and authority in the family business hierarchy, also involving relations with top management and unfamiliar middle management.
The data show that the creation of a factory to slice the cured meats and pack them in trays to sell them to the distribution chains, was made possible by the creation of an organizational unit in the USA led by a member of the controlling family.

After evaluating the investment opportunities in the United States and planning its implementation, MV was given the leadership of the project. The venture was the most important and innovative exploration strategy the company had undertaken in its recent history and, consistent with family governance beliefs, could only be undertaken by a family member.

MV oversaw the formation of a company in the US, recruited the managers who would run that project and took charge of the start-up and management of the business in the US. This role changed his role in the family governance and management hierarchy. He started to travel frequently to the USA and spent a lot of time in the new business unit. Non-family Italian managers who had helped plan the initiative before its implementation were also recruited to the US company.

In a short time, the business unit in the USA began to operate and achieved initial but important commercial success, signing contracts with some of the most important distribution chains. The management of the US business unit soon became a highly autonomous entity that looked to its parent company, Vercor, for resources and products within the timeframe necessary to take advantage of market opportunities in the US. Managing the business unit in the United States required a different

management approach. Strategic and operational decisions had to be made more quickly, based on cost-effectiveness analyses and performance measurement tools that were more advanced than those usually used in other markets. Mercor's business began to benefit from the improvements in management practices adopted in the US for the management of the business unit. MV had to adopt a new management approach, which was also transferred to the link with Vercor. It also introduced the same management approach to the activities in Vercor for which it retained responsibility in order to try to improve the operation and management of the Vercor business. As a result, his reputation among Vercor's managers grew and they started to consider him as the future leader of Vercor in the generational transition, as soon as FV decided to retire. In this respect, some managers said:

"He (MV) demonstrated his ability to manage a new business that was very different from what we manage in other markets. His leadership qualities emerged and we managers thought that a succession of leadership and a new family governance structure was emerging.

"Family governance began to recognise MV's performance and give it the role it deserved. The high cohesion of the family allowed the adaptation of roles and balances in family governance without conflict" HR Manager

"The innovation strategy has been very important in shaping Vercor's future prospects. In this company, we are lucky because the family governance has promoted and accompanied the strategic guidelines for the development of the company" Commercial Manager.

Within the family governance, the value created by MV's leadership in the US was recognised and its authority grew significantly. Roles within the family governance and management hierarchy began to change, with major strategic decisions progressively concentrated in MV. Likewise, Vercor's management recognised the results over time and the ability of MV and its managers in the US to innovate strategy and introduce new managerial skills and tools that produced important innovations in the business model, both in market activities and in internal organisational processes. Both in the family governance and among non-family managers, the conviction spread that the US business unit was the most dynamic component of Vercor and prospectively the unit with the greatest driving force for Vercor. The management and the results obtained by the business unit in the United States began to push for consistent adjustments in family governance, as well as in the leadership and organization

of Vercor's management in Italy.

Thus, we found that ambidextrous strategies interact to produce reciprocal adaptations and needs for change that produce family governance evolution and business model innovation.

DISCUSSION AND CONCLUSIONS.

Our research contributes to explaining the integration of strategy and governance in the family business from a process perspective. By deepening the link with family governance, helps to explain the *heterogeneous innovation behavior* in family firms (e.g., Chrisman & Patel, 2012; Duran et al., 2016; Zybura, Zybura, Ahrens & Woywode, 2021), which is an important predictor of their long- term survival. Therefore, this paper provides several contributions.

First, in this research we propose a process perspective to investigate the relationship between family firm governance and ambidexterity. This approach has allowed us to observe in fine-grained terms their mutual interaction and the variety of reciprocal micro-adaptations that, over time, explain which behaviour led to the evolution of governance towards new balances and business model innovation. This approach also allowed us to bring out the continuous transformation of the phenomenon in relation to events, time, behavior and interactions of the actors involved in the process (Hjorth et al., 2015; Tsoukas and Chia, 2002). Previous research has predominantly considered the family firm as a context variable in which family governance has a one way relationship with ambidexterity. Our research advances previous studies and highlights, from a process perspective, the purposeful behavior of the family firm to undertake exploration and exploitation initiatives that are enabled or that transform equilibrium situations in governance processes. Therefore, this research adds to the studies of strategy opened up on the relational and mobile state of resources and knowledge (Langley, 1999; Pettigrew, 1997, Poole et al., 2000). In this perspective, governance processes can enable the initiation of exploration strategies that are suitable with the exploitation of traditional strategies and governance arrangements. According to Hjorth et al. (2015), our research focuses on the experience of firm transformation that takes place from a condition prior to the initiation of ambidextrous strategies to a subsequent condition in which family governance change and business model innovation are observed, while recognizing that those states are temporary in the continuous transformation of the observed phenomenon.

Second, this research focuses on the link between family business governance as a key enabler for undertaking ambidextrous strategies. A significant insight of our research is the link between

governance and ambidexterity as a relationship of interdependence and mutual conditioning. Although previous studies have privileged the relationship between ambidexterity and the composition and behaviors of top management (e.g. Kammerlander et al., 2020), despite a few exceptions (Veider and Matzler, 2016) little research has delved into the relationship with governance, despite its relevance to strategic decision making, especially in family firms. Leveraging the results of our research, we argue that governance is the key element to make it possible to initiate and implement ambidextrous strategies that are then pursued over time, if in line with the current and prospective equilibrium of the governance system. This insight extends the theoretical understanding of the *heterogeneous innovation behavior* of family businesses (Chrisman and Patel, 2012; Duran et al., 2016) which has been recognized as a significant predictor of their long-term survival (Kammerlander et al., 2020). In the case that we studied, specific traits of the owner family and the family governance, such as the cohesion between family members in charge of governance and the running of the business responsibilities, the latent search for a solution to a close need for intergenerational succession in the leadership of the firm, consistency with the system of values and the anchoring to the tradition of the exploration project favored the design and implementation of ambidextrous strategies. The plurality of potential candidates for succession to the entrepreneurial leadership and the high number of members in the owner family, many of these not involved in the management, could have led to different choices, both of resistance to innovation of the business model and of discontinuity in governance (strategic direction and ownership). The effective compatibility between the exploration strategies and the characteristics of the investigated company, both in terms of organizational values, anchoring to tradition, relationships between the members of the controlling family, have instead allowed to undertake a highly innovative exploration strategy. Therefore, although the role of non-family management may be decisive in designing the innovation content and planning the new business venture, the consistency of the exploration strategy with the characteristics, needs, goals and values of family governance is a decisive antecedent for its approval. Consequently, this explanation leads to allow for different behaviours in different family firms, overcoming the homogeneous and monolithic view of family firms.

Third, business model innovation is the outcome of the evolution over time of the integration of family governance and ambidexterity, which represent integrated agents of change. On the one hand, family governance plays the role of bridge between exploration and exploitation strategies and sets the rules for their role in the family business. On the other hand,

Therefore we extend the growing literature on exploration (e.g., Naldi et al., 2007) and exploitation

(e.g., Patel and Chrisman, 2014) in family firms by highlighting that the involvement of family governance has an important effect on innovation. While recent research has increased our theoretical understanding on the innovation investments and outcomes of family versus nonfamily firms (Duran et al., 2016) and on the levels of exploration and exploitation in family versus nonfamily firms (Patel and Chrisman, 2014), we go deep into the behaviour of the family business in order to understand which specific elements explain differences between one family business and another. For family firms, organizational ambidexterity (OA) is crucial as it is for non-family businesses. However, the nature of family firms will cause innovators to encounter fundamentally different organizational advantages and disadvantages regarding innovation (König et al., 2013). Previous research found that ownership positions of family members and family involvement in the running of the business, as well as the family structural composition composition (Veider and Matzler, 2016) does not necessarily create or destroy value in the context of organizational ambidexterity. Kammerlander and Ganter (2014) suggest that family-related, non-economic goals are not necessarily detrimental to the firm and certain non-economic goals may facilitate the firm in advancing its economic objectives.

Our research shines a spotlight on the interaction between governance actors and the managers involved, their expectations, beliefs and goals produce continuous decisions and behaviours that influence the strategic trajectory and effective integration with governance. Business model innovation originated by the change produced by exploration and exploitation choices can determine effects on family governance and firm leadership. Consequently, strategic and governance changes are effective if the family succeeds in preserving the core values that underpin the balance between family members and between the family and the business. This dynamic adaptation affects the business model innovation process over time.

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Design Sprints vs. Design Thinking – a conceptual comparative analysis

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Abstract

The 'Design Sprint' is an increasingly popular process concept offering (primarily companies) a way to quickly generate and test ideas before embarking on costly development or production processes. The general discourse among practitioners in the domain of design and design consultancy suggests that the Design Sprint is like a quick version of the much more prevalent and studied (though debatably indistinct) concept of Design Thinking. However, due to the novelty of the (prevalence of) the Design Sprint concept, not much research has so far treated the topic of Design Sprints. Thus, hitherto, the alleged relationship between Design Sprints and Design Thinking relies more on anecdotal wisdom than conceptual scrutiny.

In this article, I will investigate the relationship between Design Sprint and Design Thinking by means of a conceptual comparative analysis. The purpose is to establish a more solid conceptual foundation of, and potentially distinction between, both concepts and the way they are used. This may be useful to designers when selecting process strategy, to companies trying to understand what kind of service they are buying into, and to the design research community as a basis for further research into Design Sprints.

The first part of the article introduces the concept of 'Design Sprints'. Next, I specify how the two concepts of Design Sprint and Design Thinking are defined and delineated in this article.

After this follows a comparative analysis of 'Design Sprint' and 'Design Thinking'. Lastly, the article discusses the found differences and similarities between the two concepts.

The findings of this article present both similarities and differences between Design Sprints and Design Thinking. The similarities reside on an overall principal level, as well as on certain specific methods and tools. The differences relate to eight identified contrasts. On basis of the findings, I argue that Design Thinking is most appropriate in complex problems contexts, whereas the Design Sprint, in its current form, is better suited for more well-defined problem contexts.

However, I propose ways of combining aspects of the two approaches to release synergetic value.

Overall, the article contributes with a conceptual clarification of the concepts of Design Sprints and

Design Thinking as well as the relation between them. Additionally, the article proposes valuable contexts of application for each approach, as well as combined potential.

Keywords

Design Sprint; Design Thinking; Review; Comparative Analysis

1. Introduction

In the later years, the concept of Design Sprints (DS) has gained increased interest and popularity in the organizational world (Correio and Fleury, 2019, p. 23), and is used among design agencies and companies as a way to quickly generate and test new ideas, often as a part of new product development. An abundance of DS proponents can be found by a quick google search, revealing that countless design and business consultancy agencies, course providers and even public educational institutions worldwide now offer DS facilitation, workshops or education. Also by DS critics, the popularity of DS is acknowledged, which, one might add, makes the critique worthwhile. For example, Jeff Davidson, designer, inventor and behavioral strategist, writes in a 'Medium' article that "The 'Design Sprint', made extremely popular by Google Ventures is a highly problematic approach to innovation" (Davidson, 2020), and Asger Østerbæk, then Strategic Design Director at the design agency DesignIt, writes in a likewise DS critical column for the trade (web)journal 'Markedsføring' that "three years ago, Jake Knapp (Google Venture) and co. published the book "Sprint – How to Solve Big Problems and Test New Ideas in Just Five Days". Since then, the phenomenon design sprint has spread faster than a multi resistant MRSA all over the design industry."[1] (Østerbæk, 2019).

Despite the growing popularity of the DS, it is still a new concept, and very little research has so far has been done to understand the concept in an academic perspective. In the general design discourse, as well as in the sparse academic literature, the concept of DS is referred to as closely related to that of Design Thinking (DT) (See e.g., Shin and Thomas, 2015; Vechakul, Shrimali and Sandhu, 2015; Valentine *et al.*, 2017; Burchardt and Maisch, 2018; Martinez *et al.*, 2018; Pereira and Russo, 2018; Correio and Fleury, 2019), typically as some sort of subset to DT. For example, Burchardt & Maisch (2018) write that "Within the design thinking community however further rapid formats have been developed like the Google Design Sprint (...)", Pereira and Russo (2018) list the

DS as an example under the heading “Different phases and activities of DT approaches”, and Correio and Fleury (2019) hold that “Design Sprint (DS) is a new design methodology for designing new products that resembles Design Thinking (DT)”. Former Product Design Director at the DS agency AJ&Smart (who collaborates with DS founder Jake Knapp on the development of the DS), Rob Hamblen, considers the two concepts DT and DS very much alike, yet also conceives the DS to be a “subset of Design Thinking” and suggests that the DS can be considered "Design thinking on steroids"[2], and in the Book ‘Sprint : how to solve big problems and test new ideas in just five days’ by Knapp et al. (2016) write that “If you are familiar with lean development or design thinking, you’ll find the sprint is a practical way to apply those philosophies” (p.17).

Though the resemblance between DS and DT may seem obvious from an anecdotal point of view, the relation between the concepts has not been conceptually and theoretically scrutinized. The aim of this article is to theoretically and analytically examine the relation between the two concepts in order to clarify each, the relation between them, and contexts of application in which they are useful. Since much research has already been undertaken on the concept of DT, this comparison will obviously serve most enlightening to the newer concept of the DS.

By conducting such a systematic and academic scrutiny it is possible to avoid that ’the baby is thrown out with the bath water’, which is a risk when a concept becomes a ’hype’ (Johansson and Woodilla, 2010, p. 19) and exposed to criticism without being properly defined and delimited first. A hype occurs when the public expression and rhetoric of a concept becomes incongruent with (or is not supported at all) by academia, a thus sets off as “a spiral of social amplification” – through new twists on the theme. This may contribute to a short life of the concept (Johansson and Woodilla, 2010, p. 4). DT and the DS have become popular for a reason, and rather than judging them good or bad individually or compared to each other, the purpose of this article is to gain insight to the value they each hold in relation to a context of application.

Thus, it is the hope that the research presented in this paper can be useful to both designers when selecting process strategy, to companies trying to understand what kind of service they are buying into, and to researchers in terms of positioning future research of Design Sprints.

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[1] Translated from Danish by the author of this article

[2] From a conversation I had with Rob Hamblen in November 2018 at AJ&Smart in Berlin

2. Design Sprint

The DS is a condensed five-day process model in which (primarily) companies can go through the stages of mapping the problem, sketching and deciding on ideas, building a prototype of the solution, and testing it with customers. This process is depicted in Figure 1 below.

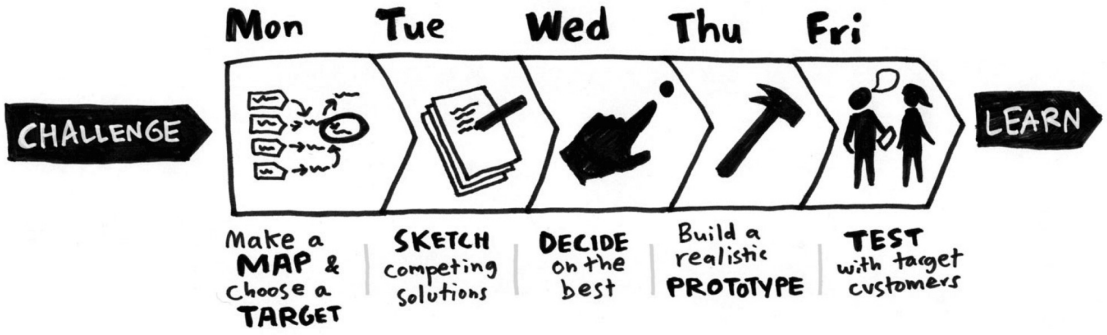

Figure 1: The design DS process visualized (Knapp, Zeratsky and Kowitz, 2016, p. 17)

The DS process was originally developed and tested by Jake Knapp internally at Google and later used with start-up companies at Google Ventures (GV). The development of the DS was motivated by Knapp's interest in process optimization and his encounter with questions that surfaced assumptions about how to best run team development processes. For example, teams often tend to use brainstorms, but during the development of the DS concept, Knapp found that individually generated ideas work better. The mitigation of such assumptions or 'defaults' came to make up a core contribution of the DS. Knapp describes how each of the five DS days confronts a distinct, typical 'default' by means of a new approach. See table 1.[3]

	Default	**DS approach**
Monday	Plan everything perfectly/ Do everything at once	Focus on one key moment
Tuesday	Group brainstorm	Work alone together/ (healthy) competition for best idea
Wednesday	Endless discussion	Fast & decisive (silent reviews, decision maker decision)
Thursday	Build and launch Minimal Viable Product	Fake it (build a facade)
Friday	Wait for perfect data	Quick and dirty data

Table 1: Defaults and DS approaches

A main point of the DS is to make a shortcut in the typically long process of developing and launching a (minimal viable) product before getting feedback from users (Knapp, Zeratsky and Kowitz, 2016, pp. 15–16). The DS suggests that in just five days of focused work, the companies can get quick feedback from users, which can then feed into and enlighten the further development

[3] The five defaults and ways to tackle them presented in Table 1 are based on presentations I have seen made by Jake Knapp (in Oct 2018, April 2019, and May 2019). The sprint book also features a somewhat similar list (p. 230-231), but I find the description from the presentations more concise.

process of which the DS is considered part. One major benefit of this way of working is, according to Jake et al., that it helps companies "fast-forward into the future to see their finished product and customer reactions, before making any expensive commitments" (p. 16). In this way, companies can test hypotheses and potentially fail early and thus minimize the risk of doing so later after having invested immense amounts of resources on a project. Researcher from Google, Michael Margolis – who, in collaboration with Knap and colleagues, added the test to the DS format in the development of it – describes this as a 'De-risking'[4] mechanism of high value to a company. De- risking helps remove fear of failing and the risk of failing at the high cost that follows if a company "waste time building the wrong things".

According to Knapp et al. (2016), the DS can work for any kind of project (p. 16) in any field (p. 4) by any team (p. 4). The sprint team is advised to adopt a 'prototype mindset' (p. 168, p. 252) and go after their most important problem, which can relate to the following situations (p. 26):

- High stakes: If you are facing a big problem and the solution will require a lot of time and money. In this case the sprint can be used to check that you steer in the right direction before going "full steam ahead".
- Not enough time: If you are up against a deadline and need solutions fast, the sprint can provide the speed needed.
- Just Plain Stuck: If a project is hard to start or has lost momentum, a sprint can be a booster that provides a new approach to make progress.

In its nature, the sprint book (Knapp et al., 2016) reminds of a 'cookbook' prescribing certain sprint components in a certain sequence. For example, Day 1, Monday, can be seen in Table 2 (the full list can be found in Appendix 2). The component list features a headline, which captures the overall aim for the day, a checklist of what to do, which is elaborated in the sprint book, and a list of key ideas which gives a bit of explanatory background.

[4] In an interview I conducted with Michael Margolis over skype on November 7th, 2018. The quote comes from interview notes.

Monday	Headline	Make a map and choose a target	
	Checklist	Introductions (abbreviated)	To schedule, team members, and sprint process
		Set a long-term goal	Ask optimistically: Why are we doing this project? Where do we want to be in x amount of time from now?
		List sprint questions	Ask pessimistically: How could we fail? Turn these fears into questions you could answer this week.
		Make a map	Make a simple flowchart in between customers/key players on the left and completed goal on the right that shows customers/product interaction. 5-15 steps.
		Ask the Experts	Interview team and external experts. 15-30 min each. Ask about the vision, customer research, how things work, and previous efforts. Update long-term goal, questions, and map as you go
		How Might We notes	Reframe problems as opportunities. Start with the letters "HMW" in the corner of a sticky note. Write one idea per sticky note and make a stack during interviews.
		Organize *How Might We* notes	Stick *How Might We* notes on wall. Group similar ideas. Label emerging themes. 10 min.
		Vote on *How Might We* notes	Votes for most useful HMW's: Each person has two votes, can vote on his or her own notes, or even the same note twice. Move winners onto map.
		Pick a target	Circle most important customer and one target moment on the map. The team can weigh in, but the Decider makes the call.
	Key Ideas	Start at the end	Start by imagining your end result and risks along the way. Then work backward to figure out the steps you'll need to get there.
		Nobody knows everything	Not even the Decider. The sprint team knowledge is locked in each person's brain. To solve the problem, this knowledge must be unlocked, and a shared understanding built.
		Reframe problems as opportunities	Listen carefully for problems and use "How might we" phrasing to turn them into opportunities.

Table 2: Sprint component example of day 1: Monday

At times, the sprint book (Knapp et al., 2016) presents theory to support its point – for example to explain why the prototype should be tested with exactly five users (p. 197-198). But in general, the book, and the concept of the DS presented in it, is rather built upon an extensive amount of practice experience and testing, involving several years[5] of work and more than a hundred DSs with start- ups at GV (p. 6), besides from the DSs ran internally at Google before that (p. 4).

All building on the 5-day Google Design Sprint (referred to as 'DS' in this article), different sprint variations have emerged. For example, the Berlin based design sprint agency AJ&Smart have developed what they call the 'Design Sprint 2.0' in collaboration with Jake Knapp – a condensed 4-day version of the original 5-day sprint – and the Design Sprint Academy has introduced what they call 'Design Sprint 3.0', devoting extra time to exploration of the problem space up front. In my work as a design-researcher, I have witnessed many different interpretations of the DS format that have been conducted under the tag of 'Design Sprint'.

Delimitation

The idea of working with compressed design process formats has been practiced for many years, most famously at world renowned IDEO (Valentine *et al.*, 2017; Correio and Fleury, 2019).

However, at the same time, IDEO is closely linked to the general concept of 'design thinking' (Kimbell, 2011). Thus, the way of working represented by IDEO cannot be used in a comparison and distinguishment between the DS and DT.

In 2018, I conducted a structured review of general and academic publications on DSs as research for this article. In this review, I found no other published literary source than the 'sprint book' (Knapp, Zeratsky and Kowitz, 2016) to be de- or prescriptive of the concept of DS. Only 13 peer reviewed articles were found to mention the DS, of which only three presented findings related to the DS. None of these contributed with additions to the DS methodology itself. (See Appendix 1 for details on review procedure and findings). Since this review, more academic work has been published on the DS. Amongst, an article by Correio and Fleury (2019), comparing DS with DT in an empirical context, which I will return to in the discussion. Correio and Fleury maintain that the DS "is still unexplored in the literature, without an analysis of best practices, and how this process may be more appropriate than traditional DT processes". In correspondence with the findings of my review, they find that "Among the many options that have emerged in the market, the [DS] methodology that is most evident, conceived by Google Ventures, is the Design Sprint (DS) process (KNAPP *et al*., 2016)."

On the basis of these rationales, the concept and description of the DS, represented in this article, is delimited to the DS coined and conceptualized by Knapp and colleagues in the book 'Sprint : how to solve big problems and test new ideas in just five days' (Knapp, Zeratsky and Kowitz, 2016). For the sake of ease, I will refer to this book as 'the sprint book' onwards.

3. Method

In this section, I will describe the way in which the concepts of DS and DT have been delineated for comparison and how they have subsequently been compared.

Delineation of DS concept

To delineate the concept of the DS and provide a structure for the comparative analysis, a point of departure was taken in the DS component list, which was exemplified in the previous section. Yet,

[5] Since approximately 2009 (Knapp et al., 2016, p. 2)

the full list of DS components, which can be found in Appendix 2, includes a very high number of components, among which several show thematic resemblances. For this reason, the full list of DS components was inductively clustered and condensed into themes. This resulted in a total of ten themes, based on which the comparison to the DT concept is embarked. The ten themes are displayed in Table 3:

1	Overall framework
2	Problem designation and nature
3	Mapping and framing the task
4	Decision-making
5	Team and collaboration
6	Concentration
7	Overview
8	Visualise by sketching
9	Data intake and analogy
10	Prototype and test

Table 3: DS themes

The themes were found by firstly writing notes for each component. Going through the component list, I assigned each component, including notes, with a headline concept. If the following component bore thematic resemblance to the previous, it was subsumed under the same headline. If necessary the headline was rephased to accommodate potential nuances that the new component brought to the theme. If the following component did not fit thematically with the previous, it was given a new headline. The theme list was refined and condensed over a couple of rounds. The procedure described above is reflected in the table in Appendix 2. The ten thematic clusters generated by this procedure form the structural basis for the comparative analysis between the DS and the DT concepts.

Delineation of DT concept

To delineate a pool of literature characterizing the DT concept and discourse, a meta-review was conducted of articles themselves reviewing the concept of 'Design Thinking'. The reason for this choice is that the review articles portray the broad and general discourse, rather than individual interpretations of the DT concept.

The review was conducted by a protocol-driven method across 6 databases combined with a 'snowballing' method for papers which occurred relevant during the search. First, the review articles were quantitatively discovered, next they were qualitatively assessed for relevance. Thus, articles were excluded if the topic or review did not focus specifically on the concept of 'Design Thinking', if the relation between the concepts of 'Design' and 'Design Thinking' remained assumed or implicit, or if their 'review' of DT constituted only a brief description of the concept or minor part

of the article without any independent analysis or category-synthesis. The detailed review procedure can be found in Appendix 3.

In total, the review resulted in a collection of 20 articles found relevant to the review purpose. Appendix 4 features a list of the 20 articles. These articles constitute the pool of literature taken to represent the 'DT literature' in this article. Hence, they serve as the basis for the comparison with the DS. Where deemed relevant in the comparative analysis, additional theoretical sources are included to nuance discussion of theories and concepts.

The specific, qualitative *content* of the DT articles, taken to represent the DT perspective on the ten themes derived from the DS, will be presented throughout the comparative analysis.

Method of comparison

The comparative analysis between the DS and the DT concepts, presented in the following section, was conducted as follows:

1. For each DS theme, I defined a series concept indicator words. These were identified by looking at the verbalization of the affiliated components, and, for each word found, conducting a synonym search to expand the pool of potential concept indicator words. For example, indicators of the theme 'Team and collaboration' were words such as 'team', 'group', 'divers*', 'cross-disciplinary', 'co-create', 'collaborat*', and 'share*'.
2. For each theme, I used each concept indicator words to conduct a search in the pool of DT articles, trawling the entire pool of articles for occurrences of the words. Thus, if a theme was represented by 12 concept indicator words, 12 individual searches were conducted for this theme across the entire pool of DT articles.
3. For each instance, i.e., text section, found through this search tactic, I qualitatively assessed whether the instance in fact represented a DT perspective on the DS theme in question.
4. All relevant instances from the DT articles to the DS theme in question were extracted from the articles, and these were analysed to find the patterns among them.
5. The findings from this analysis are taken to represent the general DT perspective on the DS theme in question in the comparative analysis.

4. Comparative analysis: Design sprints vs Design Thinking

The comparative analysis of the concepts of DSs and DT presented in this section will structurally build on the DS themes described above.

4.1. Overall framework

This section distinguishes itself from the succeeding sections in that it includes aspects of the DS that are only implicitly hinted in the DS component list. It relates to the overall DS process and its conditions rather than individual process steps.

Level of detail

The sprint book contains very prosaic and practical details about breaks, lists of supplies, and 'facilitator tips', which are telling of the DS: It is a very practical process recipe that explains in detail each step of the process, and which makes the DS easy and efficient to run.
The DT literature, on the other hand, does not go into details about how exactly to execute a design process step by step. Rather, it can be seen as a field of design theory and practice.
According to Carlgren et al. (2016), "DT is not seen as a prescriptive process, rather the emphasis is on a number of principles" (p. 45). Thus, DT remains, on a more general level, focused on the tools (Tschimmel, 2012; Liedtka, 2015), phases (Bauer and Eagen, 2008), context (of discourse or practice) (Johansson and Woodilla, 2010; Kimbell, 2011) and cognitive/ epistemic modes (Bauer and Eagen, 2008; Garbuio *et al.*, 2015, 2018; Liedtka, 2015) involved in DT.

Process stages and motion

Plenty of models describe the DT process and its phases. Table 4 below shows the process models represented in the review for this article, and a comparison of their distribution of phases and activities.

Literature Source	Model name	Number of phases	Phases					
Tschimmel (2012)	IDEO (3 I)	3	Inspiration			Ideation	Implementation	
	IDEO HCD model	3	Hearing			Creating	Delivering	
	Hasso Plattner Institute	6	Understand	Observe	Point of view	Ideation	Prototype	Test
	Double Diamond (British design council)	4	Discover		Define	Develop		Deliver

Micheli (2018)	Stanford Design School	5	Empathy		Define	Ideate	Prototype	Test
	IBM	4	Understand	Explore		Prototype		Evaluate

Table 4: DT models and phases

Based on these DT models, a combined description of the typical phases could look like the one shown in Table 5:

1	2	3	4	5
Explore and understand problem, context and user needs (collect data)	Frame task (define/ choose what data to work with)	Generate and visualise multiple ideas	Choose an idea and build it (prototype)	Test, evaluate and refine idea for delivery

Table 5: Typical DT process phases

If positioned in relation to the typical process phases in Table 5 above, the DS may look like this (Table 6):

		-	Mon	Tue	Wed	Thu	Fri
Knapp et al.	Design Sprint	5	-	Map & Target	Sketch	Decide	Prototype	Test

Table 6: Phases of DS

The DS starts on Monday with a 'framing' phase, narrowing down a problem (elaborated in section 4.3), which reminds of the 'define' phase in the Double Diamond and the Stanford Design School models. After this comes a sketch phase, resembling what often called 'ideation' in DT models. After this, a 'decide' phase, which is distinct for the DS, as no DT model distinguishes any decision-making activity between 'ideation' and prototyping. The explanation can be that the DS is described in that much more detail. Finally, the phases 'prototype' and 'test' mirror many DT models.

Table 6 shows that the DS does not involve an 'understanding' phase with in-depth problem and user research. As DT is pervasively associated with exactly this phase and activity (Bauer and Eagen, 2008; Hassi and Laakso, 2011; Kimbell, 2011; Liedtka, 2015; Carlgren, Rauth and Elmquist, 2016; Elsbach and Stigliani, 2018; Hernández *et al.*, 2018), this is the most significant difference between the DS and DT.

Though the DT literature agrees that a process involves both divergent and convergent thinking (See e.g. Tschimmel, 2012; Carlgren, Rauth and Elmquist, 2016; Kleinsmann, Valkenburg and Sluijs, 2017; Garbuio *et al.*, 2018; Zheng, 2018) the DD model stands out by actually explicating the mode of cognition for each phase: 'Discover' and 'Develop' are divergent, and 'Define' and

'Deliver' are convergent. If we compare the motions of divergence and convergence in the DD model to the DS, it could look like this (Table 7):

D e, data increased Converge, data narrowed down

British design council	Double Diamond (DD)	4	Discover	Define	Develop			Deliver
Knapp et al.	Design Sprint (DS)	4	-	Map, target	Sketch	Decide	Prototype	Test

Table 7: Convergent and Divergent phases – comparison between the Double Diamond model and the DS

Table 7 suggests that the DS starts with a phase of convergence, in which the task is mapped and framed (see also section 4.3). This phase can be compared with the 'Define' phase of the DD model, in which to "review and narrow down your insights and establish your project's main challenge"(British Design Council, 2005).

Next, both models proceed to a divergent phase, 'Develop' in the DD model and 'Sketch' in the DS, where ideas are generated. However, where the DD model's divergent 'Develop' phase stretches all the way through prototyping until the final testing, the DS moves on to a converging phase of decision, before resorting to prototyping. Thus, the prototyping phase of the DS model is more of a refinement and further particularization of the idea chosen in the 'Decide' phase. In fact, the sprint book specifies that the storyboard, which is made on decision day 3, "removes all guesswork about what to include" in the prototype (Knapp, Zeratsky and Kowitz, 2016, p. 166).

Hence, prototyping in the DS can be considered a converging and not a diverging phase.

The DD model's last step is 'Deliver', where the job is to "finalise, produce and launch your project and gather feedback about it" by final testing (British Design Council, 2005). Though the 'Deliver' phase involves 'testing', it is aimed at finalizing a project, and thus different from the 'test' phase in the DS, where data are collected to provide insights, e.g. for the kick start of a big project (Knapp, Zeratsky and Kowitz, 2016, p. 26).

It should be noted, that within the overall phases there can be micro-movements of both divergence and convergence.

A visualization of the comparison between divergence and convergence in the two models is displayed in Figure 2.

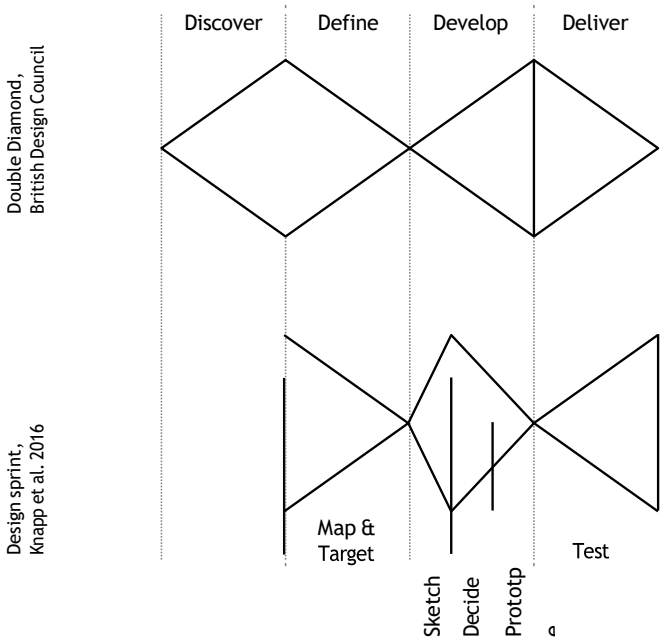

Figure 2: Comparison between Divergence and Convergence in the Double Diamond model and the Design Sprint model

Figure 2 suggests that the process motion in terms of divergence and convergence is dissimilar in the DS and DT. DT starts and ends converged at a 'narrow' state, and the DS is opposite. Thus, the DS assumes that much problem information is already present and ready to be narrowed down and framed. DT, on the other hand starts by taking in more information in order to understand a problem. The difference may relate to the fact that DT process descriptions cover entire development processes, whereas a DS can be merely the start of a longer process (Knapp, Zeratsky and Kowitz, 2016, p. 26).

Iteration

In the DT literature, the concept of iteration is considered a core principle (see e.g. Bauer and Eagen, 2008; Çalişkan, 2012; Glen, Suciu and Baughn, 2014; Zheng, 2018; Hernández *et al.*, 2018; Micheli *et al.*, 2018). Iterations are processual sequences of gathering data, generating ideas, and testing them (Kimbell, 2011; Liedtka, 2017) and happen when the process loops backwards, repeating these phases (Bauer and Eagen, 2008; Tschimmel, 2012; Carlgren, Rauth and Elmquist, 2016; Chou, 2018) with the purpose of rethinking or refining ideas and potentially taking a new

direction (Chou, 2018) by reframing the problem (Schön, 1983).
The concept of iteration is not mentioned explicitly in the sprint book, but since the DS is suggested as potential process catalyst, the DS outcome is described as 'learning' (Knapp et al., 2016, pp. 222-223), and 'next steps' must be decided (p. 221), further processual action is presumably meant to be taken based on the DS. If such further action is likewise experimental in nature, then the DS can be seen as one iteration out of several in a longer process. In this case, the DS can be considered one local experiment within a larger global problem context (Schön, 1983).

Facilitation

A vital role in the DS is the facilitator. The person holding this role is "responsible for managing time, conversations, and the overall process" (Knapp, Zeratsky and Kowitz, 2016, p. 36). The facilitator may be an outsider, and if not, the facilitator must "act as an outsider" (p. 90) and "remain unbiased about decisions" (p.36). Whether or not the facilitator should engage actively in *creating* the ideas e.g., sketching or prototyping activities, is not mentioned in the sprint book. The facilitator role is inherently different from the rest of the DS team, and much more focused on sustaining the structure of events than generating the creative content that is to emerge within this structure.
In DT, the concept of facilitation is also central (Tschimmel, 2012; Liedtka, 2017). In DT, the role of a 'facilitator' often coincides with that of a 'designer' (Bauer and Eagen, 2008; Liedtka, 2017; Hernández *et al.*, 2018), whereas in the DS the 'design expert' role is described separately from that of the facilitator. In DT, the 'design agent' (individual or team) can be understood as a facilitator or 'midwife' of the creative process, helping non-designers go through co-designing processes (Tschimmel, 2012; Liedtka, 2017). The DS on the other hand is not a co-design process in the common sense (see section 4.5 and 4.10).

Target group

The DS was originally developed to spur efficiency in collaborative work and development processes within organizations. It started at Google, later adapted for the start-up context at Google Ventures and eventually developed to the DS format it is now known as today. Today, several sprint variations have occurred which are used in various contexts.
DT is not a specific way of working developed at one place, but a field of knowledge affiliated with certain principles, tools, and methods, that has grown out of design practice and research through more than 50 years (Hassi and Laakso, 2011). DT is characterised by a divide in the source of its

origin between 'Design Thinking' and 'Designerly Thinking' (Johansson and Woodilla, 2010; Johansson-Sköldberg, Woodilla and Çetinkaya, 2013). 'Design Thinking' relates to a management discourse, in which 'Design Thinking' is used in business development and innovation, whereas 'Designerly Thinking' relates to the design practice and the theory describing it. Thus, 'Design Thinking', like the DS, targets managers and companies, whereas 'Designerly Thinking' targets designers, the design research community, and design education.

4.2. Problem nature and designation

DT provides tools and principles to tackle uncertainty, risk and ambiguity involved in complex and wicked problems (see e.g. Bauer and Eagen, 2008; Liedtka, 2015; Micheli *et al.*, 2018).

According to the sprint book, the DS can be used for any kind of project, and for challenges such as testing the direction in the beginning of a longer process, reaching a solution quickly before a project deadline, or boosting project that is stuck (Knapp et al., 2016, p. 26).

The sprint book advices companies to choose a big challenge, i.e. 'their most important problem', for the DS (Knapp, Zeratsky and Kowitz, 2016, p. 27), since that is what makes people invest the time and effort to do the DS. The important and urgent problem of the DS may be, but is not necessarily, complex. In fact, it could be well-defined. Whether a DS problem is more complex and ill-defined or more straightforward and well-defined may relate to the question of when in a process it is used.

Hence, the DS and DT differ in terms of the distinction between the importance and complexity of the problem they target.

4.3. Mapping and framing the task

Mapping

The headline of the first DS day is to map the problem and choose a target. This is done by setting a goal, posing questions, making a map, and asking experts for information.

The map is construed as a simple user journey through the imagined service or product that is to result from the DS[6] (see Figure 3). The purpose of the map is "to narrow your broad challenge into a specific target for the sprint" (Knapp, Zeratsky and Kowitz, 2016, p. 60), and prevent jumping immediately into solutions (p. 54). However, as the map focuses on the solution to-be, the map is arguably more solution than problem focused, and frames the succeeding DS activities.

6. In two out of three examples in the sprint book, the process mapped is a not yet existing future scenario. In the last example, it seems that the map may relate to an existing process.

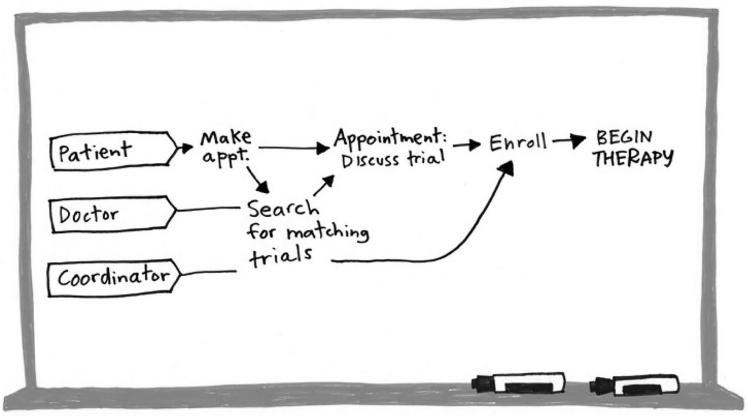

Figure 3: Example of DS map from the sprint book

In DT, mapping is also a well-known concept, typically in the form of mind maps, empathy maps, and (user) journey maps (Tschimmel, 2012; Liedtka, 2017; Garbuio *et al.*, 2018). In DT, maps are typically used as part of brainstorming (Garbuio *et al.*, 2018; Micheli *et al.*, 2018) or based on and meant to organize, categorize, understand, and make sense of existing, collected data (Elsbach and Stigliani, 2018; Micheli *et al.*, 2018).

Hence, both the DS and DT involve mapping, but in DT it is preceded by a phase of problem research and data collection, and solution focus and idea generation is deferred until later in the process (see Table 5). Conversely, in the DS, the map is made prior to any intake of external information about the task (e.g., from the exercise in which experts external to the DS team provide their perspective on the task[7]), and before the idea generating exercises on DS day 2. Hence, the solution can only be built from concepts already known to the DS team in advance, which may compromise novelty of the sprint output.

On the other hand, if the sprinting team already have a solution idea at the outset, the map may help surface assumptions and potential weaknesses nested in it. The value of early mapping is therefore contingent on whether there are preconceived solution ideas and how well-defined they are.

Framing

In the DS, the map is used to narrow down a broad challenge (Knapp, Zeratsky and Kowitz, 2016, p. 60) and "focus the sprint on the most important part of your project" (p. 84). Because this happens without previous problem research, the DS inclines more to a *framing* as opposed to a *reframing*

approach. DT, on the other hand, endorses reframing (Carlgren, Rauth and Elmquist, 2016; Kleinsmann, Valkenburg and Sluijs, 2017; Zheng, 2018).
Framing means adopting a specific perception of a problem situation, which implies that certain concepts are used to describe and circumscribe the problem and the solutions that can be found to it (Dorst, 2011). Reframing then means substituting a new frame for an existing one, which implies 'stepping back' (Kokotovich and Dorst, 2016), and, from this higher level of abstraction, shifting perspective on the task. The new perspective provides new information to the problem, and hence new ways of understanding and possibly solve it.
Reframing is instrumental in solving wicked and complex problems, since a new frame may resolve the problem paradoxes that rendered the problem wicked in the original frame. (Dorst, 2015). Thus, reframing targets the root causes of the problem (Dorst, 2011; Liedtka, 2017).
Framing alone makes more sense when a task is less complex and paradoxical.
Alternatively, it cuts away complication by focusing on a narrower part of a bigger problem, ignoring deeper paradoxes.

Though the DS is not initiated with a problem reframing, reframing may however be a *result* of the process. If the DS is meant to test a direction of a longer process, this test may result in data and insights that bring new understanding of the project and cause the company to change its direction.

4.4. Decision making

Decider

In a DS, one person on the team has the role of 'Decider'. The Decider holds the official and ultimate decision power in the DS. The Decider should be someone in a high-ranking position, who brings authority to the decisions (Knapp, Zeratsky and Kowitz, 2016, p. 30). Though the DS endorses democratic voting procedures in the process, the Decider holds the final decisive veto-

7. This order has been changed in the later Sprint 2.0 format

right. Thus, the concept of a Decider links to and underpins the hierarchical organizational structure in the company. The point is, that if ideas developed in the DS are to 'stick' and lead to viable changes in the company, they need to be made by someone who has the mandate to make sure they are funded and implemented. Besides, a Decider's mandate to cut through discussions and make a final choice ensures speed and momentum in the DS (p. 159).

In DT, especially the 'designerly' discourse (Johansson-Sköldberg, Woodilla and Çetinkaya, 2013), decision-making is considered integral to the design process itself, i.e. to the coherence and progress of the creative problem-solving process, and the quality of decisions and solutions that feeds into and results from it (Liedtka, 2017). All actors involved in the process are decision makers, and the quality of decisions hinges on their creative cognition (Liedtka, 2015) and imaginative abilities (Micheli *et al.*, 2018).

Hence in the DS, decision-making is linked to effectiveness and commercial viability, whereas in DT it is linked to processual progress and creative quality.

Dot voting

Dot voting is a way of making decisions that is particular for the DS. Dot voting means that all team members vote on ideas by physically placing dot stickers on the notes or illustrations, representing the idea they like best. However, as the Decider has the final saying in any decision, dot voting is more a way of expressing group opinions, than a democratic decision-making process. However, the visual expression of the group's opinion probably – and, one might argue, hopefully – affects the decision made by the Decider. Additionally, dot voting is a tool to avoid inefficient group discussions (pp. 127-128) and maintain momentum in the process (p. 41).

DT does not describe how to make group decisions but focusses on decision-making in more abstract terms. One emphasis is on the relation between DT and the innovative potential or output of a decisions-making process, e.g. how DT can help mitigate cognitive biases (Liedtka, 2015) or how the visual language of DT offers innovative capacity to decision-making situations (Hernández *et al.*, 2018). Another emphasis is on the difference and balance between analytical and intuitive approaches to decision making – either in relation to business (Martin, 2009; Chen, 2017) or in relation to design methodological generations (Broadbent, 2003; Bayazit, 2004).

In sum, the DS gives practical instructions on how to make effective decisions in a team but does not describe by means of what kind of thinking, and on basis of what criteria and expected implications decisions are made. Those are the topics discussed in DT.

Combined decisions

In DT, creative decisions are often made by combining – rather than choosing between – elements, knowledge, and ideas from different fields or individuals. This practice is also known in creativity theory as 'cross-fertilization' (Sternberg, 2003), in which creative synthesis is obtained by combining elements from different areas (Sternberg and Lubart, 1995; Kupferberg, 2009). In DT, two aspects of combination can be found. One aspect is the more general combination of existing elements (e.g. knowledge and concepts), for example in an act of analogical reasoning (see section 4.9) (Tschimmel, 2012; Zheng, 2018). Another aspect is the (re)combination of ideas that are actively generated in the design process itself (Bauer and Eagen, 2008; Çalişkan, 2012; Elsbach and Stigliani, 2018).

In the DS, the first of these aspects can be found in the 'Lightning demos' exercise (see section 4.9), where existing solutions are brought into play and possibly combined. Likewise, it is inherent in the team diversity, which supplies knowledge from different areas. The second aspect is less extensively reflected in the sprint book, which only briefly mentions the possibility to "combine your winning sketches into one product" (p. 145).

Since, in the DS, ideas are generated individually (see section 4.5) and decided upon through dot-voting and Decider decisions, the DS leans more towards a competition between ideas than a focus on combining ideas[8]. Thus, DS and DT are overall comparable on the first combinatory aspect, but less on the latter.

4.5. Team and collaboration

Diversity

Central to the DS is the *team*, that will join forces throughout the five days to solve the problem. The team should be diverse, representing different skills, areas of expertise and function/ department in the company. The team should be excited about the challenge, but bringing a 'troublemaker' as well might bring value by means of his different view (Knapp, Zeratsky and Kowitz, 2016, pp. 34-35).

In DT, a diverse team is also central (Kimbell, 2011; Liedtka, 2015, 2017; Micheli *et al.*, 2018), as it helps expand the problem space by providing different perspectives and information (Micheli *et al.*, 2018), induces reframing of the problem (Liedtka, 2017), brings different tool sets to the task (Chou, 2018) that may provide more possibilities of action, and increase the breadth and novelty of

solutions (Liedtka, 2017). The DT literature suggests several ways in which a team can be diverse. These relate to Disciplinary background (see e.g. Chou, 2018; Hernández et al., 2018); Organizational affiliation (see e.g. Carlgren, Rauth and Elmquist, 2016; Liedtka, 2017); Job function (see e.g. Liedtka, 2015, 2017; Carlgren, Rauth and Elmquist, 2016); Personal skills (see e.g. Bauer and Eagen, 2008; Liedtka, 2015); Team role (see also Bauer and Eagen, 2008); and Thinking style (see e.g. Bauer and Eagen, 2008; Micheli et al., 2018).

The most remarkable difference between the DS and DT is that in DT, diversity relating to Organizational affiliation is permeating, whereas in DS it is absent in the description of team formation. Company 'outsiders' do appear in the DS: Possibly in the Monday exercise 'ask the experts', and of course in the Friday user test. However, the *team* is not extended by these outsiders: They are not given an active role in idea generation, rather their inputs are studied and used as data. In DT, on the other hand, diverse participants often collaborate across organizational boundaries to generate new solutions.

The difference between DS and DT can in this regard be considered reminiscent of Sanders and Stappers' (2008) distinction between 'user-centered design' (studying users – and other stakeholder) and 'co-design' (creating together with them).

Individual work

According to Knapp[9], it is a common default that people or companies do group brainstorming when trying to come up with new ideas. By reference to experience, and a 1958 Yale study, the sprint books concludes that individually generated ideas are better (p. 107), as working alone "offers time to do research, find inspiration, and think about the problem. And the pressure of responsibility that comes with working alone often spurs us to our best work." (p. 107). Thus, it is a central part of the DS that many exercises take place as individual, silent work, which is subsequently shared with the group.

Both individual and collaborative aspects of design can be found in the DT literature (Hassi and Laakso, 2011; Tschimmel, 2012; Garbuio *et al.*, 2018). Yet, the collaborative aspect is more pronounced, as it is often part of the way DT is defined (See e.g. Bauer and Eagen, 2008; Liedtka,

8. Paraphrase by Jake Knapp, from a conversation I had with him in October 2018 in Oslo.
9. Workshop with Jake Knapp at the 'Webdagene' conference in Oslo, October 17th, 2018.

2015, 2017; Micheli *et al.*, 2018). In DT, the individual perspective often relates to cognitive faculties and tolerance of ambiguity (Çalişkan, 2012; Johansson-Sköldberg, Woodilla and Çetinkaya, 2013), whereas the actual practice of design is typically described as collaborative (Kimbell, 2012; Liedtka, 2015, 2017).

Though collaboration is emphasized, DT reports of empirical studies acknowledge that parts of the design practice is carried out by individuals, see e.g. Liedtka (2017), Elsbach & Stigliani (2018), and Kimbell (2012), who describes a study in which "the designers sat around a table and started to draw individually (...) They worked quietly (...) They then presented their sketches to one another" (p. 139).

In sum, the DT literature is generally more focused on collaboration than is the DS. However, in detailed description of actual practice, the DS and DT converge. This inconsistency likely relates to the level of abstraction at which 'practice' is described.

4.6. Concentration

The DS is characterised by concentration of time, place, and focus. To maintain attention and momentum the team must "block five full days on the calendar" and get rid of all distractions (p. 235). According to Knapp and co., the five-day time frame provides "enough urgency to sharpen focus and cut out useless debate, but enough breathing room to build and test a prototype without working to exhaustion" (Knapp, Zeratsky and Kowitz, 2016, p. 40).

The sprint book suggests designating one physical space throughout the week (p. 44) to support the team's attention on the task (p. 42). The physical space allows the team to visualize together, put things on the walls, and comes to serve as a shared, spatial 'brain' for the team (p. 43) (see also section 4.7).

The DT literature does not emphasize concentration of design activities. Some DT authors mention the physical place in relation to idea development and experimentation (Carlgren, Rauth and Elmquist, 2016; Garbuio *et al.*, 2018); displaying, sharing and making sense of data and visualizations (Tschimmel, 2012; Garbuio *et al.*, 2018); storytelling (Chou, 2018); and cross-team learning and reflection (Garbuio *et al.*, 2018). After all, as Kimbell (2011) states, "design still involves doing things with and to objects" and these objects reside in design studios (p. 290).

Where concentration of activities in physical space is mentioned in DT, time is not a topic of DT. Liedtka (2017) states that DT retreats from a 'compression approach' which increases innovation

speed and success, to favor more open and experiential processes (p. 7).

One reason for the differences between the DS and DT might be that the DS is very concrete, whereas DT may relate more abstractly to designers' way of thinking. E.g. Bauer and Eagen (2008) state that "The Design Agent's excursion via imagination traverses a realm where time and space have no limitations" and only afterwards "returns to the lived world with newfound possibility" (p. 66).
Furthermore, a DT process possesses no inherent logic, which determines where or when it should end. According to Rittel and Webber (1973) it is factors 'external to the problem' that force a designer to eventually stop working, for example that "he runs out of time, or money, or patience." (p. 162).
Accordingly, one may infer that DT focuses more on the factors 'of the problem', i.e., the creative content of the task and how it is generated, whereas the DS, as a generic processual structure focuses more on the factors 'external to the problem', e.g., practical guidelines and time schedules.

4.7. Overview

In the DS, several steps revolve around displaying and organizing data which have been generated or collected. In practice, this is done with sticky notes on wall surfaces. For example, organizing and grouping HMW-notes on Monday, 'Art Museum' display and 'Speed critique' of sketches on Wednesday, and organizing and making sense of interview data in a grid on Friday. These activities serve two main purposes: A shared, extended memory and an analysis procedure to make sense of data.
Exhibiting data in the physical space takes advantage of the fact that humans have a better spatial than short term memory (Knapp et al., 2016, p. 110). Citing Tim Brown, CEO of IDEO, the sprint book argues that making all data simultaneously visible, instead of keeping them in separate computer files, supports pattern recognition and synthesis among them. Thus, the entire room, in which the data are displayed, becomes like an extended short-term memory and shared brain of the DS team (p. 110).

In the DT literature there are also examples of putting things up on walls and creating overview. As described in the previous section, a physical 'design space' is the basis for visually displaying 'things' – or data – on the walls (Carlgren, Rauth and Elmquist, 2016; Elsbach and Stigliani, 2018). The most

pronounced purpose is data analysis. Here, designers organize and look for patterns in data (Hassi and Laakso, 2011; Tschimmel, 2012). Thus, data are synthesized into to new themes (Bauer and Eagen, 2008; Liedtka, 2017). This process of making sense of data informs the generation of new ideas and solution criteria (Liedtka, 2015, 2017; Carlgren, Rauth and Elmquist, 2016).
The relation between data display and cognition/ memory is also mentioned in DT as a way of alleviating the cognitive load of the designers by a visual reminder of the process information (Garbuio *et al.*, 2018). A "common mind" and understanding across team members (Liedtka, 2015, p. 928) can be obtained, as information is externalized (Carlgren, Rauth and Elmquist, 2016) and thus can be shared and discussed (Hassi and Laakso, 2011).

Hence, the DS and DT are quite similar when it comes to the practice and purpose of organizing, making sense of and sharing data.

4.8. Visualise by sketching

The display of data as well as idea generation often involve visualization and sketching. Sketching is a central component of both the DS and of DT.

In the DS, almost the entire Day 2, Tuesday, is devoted to sketching, but sketching is also part of the storyboarding exercise on Day 3, Wednesday. The sprint book explains that the power of sketching (p. 106) is that it transforms abstract ideas into concrete solution ideas (p. 107), and that when ideas a made concrete by sketching "they can be critically and fairly evaluated by the rest of the team" (p. 107).
The sprint book argues that ugly sketches are ok (p. 115) since it is the ideas that matter (p. 106). The final solution sketch, however, must be "detailed, thought-out, and easy to understand" (p. 114) so it can communicate the idea (p. 107).

In DT, sketching is a central visualization tool (Tschimmel, 2012; Carlgren, Rauth and Elmquist, 2016; Chou, 2018; Garbuio *et al.*, 2018), and can be seen as a designerly supplement to traditional analytical thinking (Glen, Suciu and Baughn, 2014).

Visualizations do not need to be sophisticated and refined, but may be simple, crude, unfinished, and rough sketches and representations (Tschimmel, 2012; Glen, Suciu and Baughn, 2014; Carlgren, Rauth and Elmquist, 2016; Hernández *et al.*, 2018).

According to the DT literature, visualization by sketching serves many purposes: It can be used in problem solving (Çalişkan, 2012; Tschimmel, 2012); a means of externalizing and sharing ideas (Glen, Suciu and Baughn, 2014; Carlgren, Rauth and Elmquist, 2016); a tool for experimentation (Schön, 1983; Micheli *et al.*, 2018); a communicative device (Kleinsmann, Valkenburg and Sluijs, 2017; Elsbach and Stigliani, 2018), e.g. by serving as boundary-spanning object (Micheli et al., 2018); a way of documenting the process (Carlgren, Rauth and Elmquist, 2016); and lastly a source of Playfulness (Tschimmel, 2012; Micheli *et al.*, 2018).

The described use and purpose of sketching in the DS and DT, render them similar on this aspect.

4.9. Data intake and analogy

In the DS, a noteworthy exercise is the so-called 'lightning demos' on Day 2, before idea sketching. In this exercise, the team members individually browse for inspiration from existing solutions to similar problems, preferably from other environments (Knapp, Zeratsky and Kowitz, 2016, p. 96). The point of the exercise is to find 'raw material' for the ideas, acknowledging that amazing ideas and great innovation do not come by divine inspiration, but builds on a remix of existing ideas (p. 96).
Except from the 'ask the experts' exercise on Day 1, 'lightning demos' is the only exercise in the DS in which external information is taken into the generative part of the sprint process. Yet, where the experts are chosen because they are familiar with the issue of topic, and likely the organization as well (p. 68), the 'lightning demos' exercise encourages intake of information deliberately non-familiar to the topic, organization, and even industry. Thus, the information yielded through the 'lightning demos' exercise provides the task with analogies that can bring novelty of the solution (Hekkert, Snelders and Van Wieringen, 2003).

Analogies are also met in the DT literature (see e.g. Garbuio *et al.*, 2015, 2018; Liedtka, 2015; Carlgren, Rauth and Elmquist, 2016) as a technique to ideation and problem solving. Carlgren et al. (2016) write that inspiration from various different fields are important in DT, and that analogies drawn from different industries, by observing how they 'solve things that are similar', are important sources of inspiration (ibid. p. 48).

Analogical reasoning means transferring properties from a source domain to a target domain based

on perceived abstract similarity between the two domains (Holyoak & Thagard, 1995, in Garbuio *et al.*, 2018, p. 46). Thereby, new solutions can be built on exemplars of what has worked in the past (Garbuio *et al.*, 2018). Analogies drawn *between* distant domains are suited for complex problems and producing novel solutions in open design situations (Garbuio *et al.*, 2015, 2018).

In summary, both DS and DT make use of between-domain analogies to support novel idea generation.

4.10. Prototype and test

In the DS as well as in DT, the prototype is inherently linked to the test of it, as prototypes are seen as a way to test cheaply, quickly and early whether an idea is good, and learn from potential mistakes (Hassi and Laakso, 2011; Tschimmel, 2012; Knapp, Zeratsky and Kowitz, 2016, p. 223; Micheli *et al.*, 2018). Thus, the testing of the prototype is built into the purpose of the prototyping activity. For this reason, the prototyping and test concepts are treated under the same heading.

The sprint book is very elaborate in the prescription of test procedures, number of test users (five), how to interview them, how to document the process, how to sort data afterwards, etc.
The purpose of the test is to answer sprint questions (p. 190) by gathering small-scale data and learning from them (p. 223) before committing to and risking the expenses of building and launching a real, possibly wrong product (p. 196). Thus, the test is often not the end of a process, but the beginning (p. 224), and it is the Decider's responsibility to decide how to follow up" (p. 223).
The DS advocates that the prototype should aim for 'Goldilock's quality' (p. 170), i.e., it should appear real on the surface, but not necessarily be functioning beneath the surface. The point is that it should be convincing enough to fake it as a real product in a test, from which the team can learn and assess their idea. Yet it should be made within just one day to fit the sprint schedule.
The sprint book makes a virtue of distinguishing between *reactions* and *feedback* from test users, where "*reactions* are solid gold, but their feedback is worth pennies on the dollar" (pp. 169- 170). A prototype with a high fidelity level will evoke honest reactions from customers, whereas a low fidelity level, e.g., a paper prototype, will break the illusion of a real product and send customers into a helpful feedback mode (p. 169), which is not desired in the sprint. This stance is not elaborated further.

In DT, prototyping is likewise a central activity (Bauer and Eagen, 2008; Chou, 2018; Micheli *et al.*, 2018) to generate and test ideas and learn fast from failures (Micheli *et al.*, 2018). In DT, prototypes are tools for thinking (Hassi and Laakso, 2011), sensemaking (Glen, Suciu and Baughn, 2014), learning (Carlgren, Rauth and Elmquist, 2016), as well as experimenting and developing ideas (Micheli *et al.*, 2018) by translating them from abstract to concrete (Bauer and Eagen, 2008; Liedtka, 2015).
Prototypes can take many different forms (Tschimmel, 2012; Glen, Suciu and Baughn, 2014) and vary in terms of fidelity level, i.e. degree of approximation to a final product. In DT, low fidelity prototypes are promoted (See e.g. Bauer and Eagen, 2008; Liedtka, 2015, 2017; Carlgren, Rauth and Elmquist, 2016), as they promote feedback (Tschimmel, 2012; Liedtka, 2015) and dialogue with users (Glen, Suciu and Baughn, 2014; Liedtka, 2017). Thus, they are associated with interaction with and activation of users in the design process (Carlgren, Rauth and Elmquist, 2016; Liedtka, 2017).

There is a sharp contrast between DS and DT when it comes to the desired level of prototype fidelity and user interaction and involvement in process and test.
This contrast mirrors a difference identified by Micheli et al. (2018) and Liedtka (2015) between how, on the one hand, prototyping is typically used in industry and product development as a means to finalize, represent, and validate products. And how, on the other hand, prototypes are used in design processes a ‘playground’ (Liedtka, 2015) to create and experiment. The varying degree of user involvement that results from the two scenarios comes to represent, again, the difference between co-design and user-centered design, described by Sanders and Stappers (2008).

There may be several explanations of the differences in purpose and use of prototypes, e.g.:
The DS originates in a commercial, corporate context, where time for development is scarce and the market is the higher court. This could motivate pushing development activities quickly forwards towards finalization, spending less time on the ‘playground’ doing multiple rounds of sketchy prototypes, and aiming more directly for a customer jury verdict.
Companies entering a DS may have more well-defined problems. Other things being equal, a more well-defined problem will naturally shorten the way from process initiation to (attempt of) an almost finished prototype. If the problem is additionally urgent, a nearly finished prototype can be

demanded.

The DS is conceived in a software development context, in which the specific media and tools used accommodates easy and fast creation of finished-looking prototypes.

5. Findings and discussion

In this section, I will discuss the similarities and differences between DS and DT found to be most significant. I will elaborate on the value potential of each concept in relation to context of application and compare the results with the findings by Correio and Fleury (2019).

Similarities

On an overall level of analysis, there are many coincidences between DS and DT. Both approaches are characterised by: Process shift between divergent and convergent thinking; solving problems and developing new solutions; collaborating in a diverse team; visualizing to externalize and make ideas tangible and sharable; overview activities such as mapping, displaying and sorting data in the physical space; and use of cross-domain analogies to support novel idea generation; prototyping and testing ideas to fail and learn fast; and emphasis on obtaining understanding of user experience. The most unequivocal resemblance between DS and DT is represented by specific tools or methods: Sketching, prototyping, overview activities such as mapping, displaying and sorting data in the physical space, and use of analogies in idea development. Thus, we can say that the DS involves one particular sample of some of the tools or methods, which, along with a list of principles, characterizes the field of DT (Micheli *et al.*, 2018).

Differences

When it comes to the differences, there are several aspects on which the two approaches differ. The most fundamental is that DT is a broad field of design knowledge, which includes process descriptions, but more generally relates to the practices, thinking styles, and mentality of designers (Hassi and Laakso, 2011). As a field of knowledge, DT is ever expanding through new understandings generated about design. The DS, on the other hand, is a particular and detailed process recipe, explaining step by step how to conduct it. Hence, holding the two concepts against each other may seem like comparing apples with pears. On the other hand, the juxtaposition of the DS and DT made by practitioners and theoreticians, actuates the comparative analysis, which, apart

from the above-mentioned similarities, sheds light on the differences. These differences relate to a number of contrasts, which, of course, are not dichotomously black or white:

Part vs whole: One way in which the DS and DT can be considered part and whole respectively, relates to the finding that the DS involves a part of the totality of tools, methods and principles that DT covers by virtue of being a comprehensive knowledge field of design. Another way relates to the process descriptions of the DS vs DT: DT process models span entire design processes from initiation to implementation. This is reflected in the converged ends of the process (Figure 2). The DS, on the other hand, can be a starting point, a boosting experiment, or a final spurt in a longer process (Knapp, Zeratsky and Kowitz, 2016, p. 26). The DS presumes that considerable problem information is available at the outset, and it ends with new data from the test, which must be followed up on in subsequent steps (Knapp, Zeratsky and Kowitz, 2016, p. 223).

Hence, the DS can be considered one iteration in a longer process, which is reflected in the diverged ends of the process (Figure 2).

Prescriptive vs descriptive: The DS is a highly prescriptive process format, focused on the *how* of the process. DT, as a field of design knowledge, is more descriptive and explanatory in nature, thus answering to the *why* of design practice. However, DT can divided between 'designerly thinking' and 'design thinking' (Johansson and Woodilla, 2010; Johansson-Sköldberg, Woodilla and Çetinkaya, 2013), of which the latter is more prescriptive than the former, as it deals with the *how* of transferring design practice and competence beyond the context of design, typically to the context of management (Johansson-Sköldberg, Woodilla and Çetinkaya, 2013, p. 123).

Structure vs content: We saw that in the DS, activities are concentrated in time, place and focus by means of the strict structure that ensures rapid results. DT does not provide a specific structure, and there are no obvious process stopping rules (Rittel and Webber, 1973). Instead, DT focusses qualitatively on the content: e.g., the nature of the problem and the development of ideas for solving it. This difference is especially reflected in the approach to decision making. The DS provides a structure for fast and effective decisions, by use of voting and authoritarian veto right, whereas decision-making in DT is concerned with processual coherence, collective consensus, and creative quality.

Commerciality vs creativity: Likewise related to decision-making is the focus on commerciality in the DS versus creativity in DT. Obviously, both approaches foster both creative and commercial value, so rather than a contrast, it is a mere propensity. In the DS, decisions rely on democratic dot-voting, but are ultimately linked to power and authority through the veto mandate given to a high-ranking

Decider to ensure management support and commercial viability of the chosen ideas and focus of the DS. Thereby, the DS supports existing organizational hierarchy structures. In DT, all participants are decision makers, and decision-making is linked to the coherence and progress of the design process with a focus on creative quality of decisions.

Additionally, the dot-voting of the DS leans more towards a competition between ideas, whereas DT stresses combinatory aspects of idea generation, which is closely related to creativity.

Important vs wicked problems: The DS is aimed at big challenges and important problems.

DT is aimed at ill-defined and complex 'wicked' design problems. An important/ urgent problem may be, but is not necessarily, complex. In fact, it could be well-defined. The degree of complexity in a DS problem may relate to whether the DS is used in the beginning or end of a longer process, since in the course of a design process, uncertainty is gradually resolved (Ball and Christensen, 2009; Yu *et al.*, 2016).

Framing vs reframing: Regardless of the overall complexity of a DS problem, it lies inherent in the DS process that potential complexity is cut away by zooming in through the early framing. Conversely, DT advocates zooming out and reframing to address the root paradox of the problem.

Solution vs problem focus: The reframing in DT is made possible by the time spent focusing on problem research, looking for the root paradoxes and causes, before resorting to solution focus and idea generation. The DS starts with an early solution focus through the mapping exercise, which conceptualizes an early solution idea. The immediate solution focus is also enhanced by the absence of a thorough problem understanding phase or focus.

User-centered design vs co-design: Finally, a very pronounced difference is that between the DS as user-centered design and DT as co-design, in the distinction set forth by Sanders and Stappers (2008). User-centered design *studies* users (and in this case other actors as well), and data from this study are used by a design team in the generative development of a design concept. Co- design *actively involve* users (and other actors) in the generative development of a design concept. This difference is seen in the conception of team diversity, which in the DS relates to disciplinary background and job position, typically within an organizational boundary, whereas DT relates to diversity as the crossing of organizational boundaries. Thus, in the DS, external actors are 'tapped off' for inputs, but not part of idea development. Conversely, in DT 'external' actors make up the team or are actively involved in idea development. The same pattern is seen in relation to prototyping and test, where the DS advocates high-fidelity prototypes to elicit user reactions, not feedback. DT, on the other hand, promotes low-fidelity prototyping to support experimentation

and communication with users and other stakeholders involved.

Value in application: Design Sprint

The distinctive features of the DS in comparison to DT is the quick format and its effectiveness. The DS addresses the most important (and already well-known) problem of the company by an easy step by step guided process that does not require special design competences. In short time, the DS team will produce a realistic looking prototype and get quick data. Thereby a direction of a project can be tested without waste of resources. The DS offers effective team decision-making without discussion and ensures top management approval. The value of application must align with and be judged by these features.

The features of the existing DS format point toward the most beneficial application on a somewhat well-defined, less complex problem in later stages of a development process. In a complex or wicked problem, the DS format will inherently cut down complexity due to early framing. Cutting away complexity from a truly complex or wicked problem may preclude the possibility of identifying root causes and paradoxes in the problem, and result in solving merely a part of the problem surface. A complex and ill-defined problem will require a deep problem research focus in the beginning of the process, whereas a more informed and less complex problem may be easier to immediately frame in a constructive manner. A more well-defined problem may also come with some assumptions about a possible solution, in which case the early mapping exercise, portraying this solution, may come to its right in revealing those assumptions.

If the process has already undergone earlier stages of more explorative conceptual development, the DS propensity toward commercial viability over creativity may also be favorable.

The rapidness and effectiveness of the DS may be a valuable selling point for companies who do not have the resources to conduct a longer design (thinking) process, which can be the case, especially for smaller companies. If a process is characterised by some uncertainty, the DS provides learning and helps steer the effort in the right direction. The strict process format may also have the advantage that it gives the impression of being effective even in creative work, which always involves uncertainty. If a five-day DS is a big investment for the company, they will want value for their investment, and if time is scarce, effectiveness is value.

The aim towards a high-fidelity prototype may be just right, if the larger process is already near the end. The DS originates in a commercial, corporate context, where time for development is scarce and the market is the higher court. This could motivate pushing development activities quickly

forwards towards finalization, spending less time on the 'playground' doing multiple rounds of sketchy prototypes, and aiming more directly for a realistic prototype and the customer jury verdict.

The promises of value in terms of effectiveness towards finalization may not just be valuably in their own right but may also be important in terms of their persuasive power towards companies otherwise reluctant to spent time on experiments. After all, it is easier to sell the idea of getting a realistic prototype than the prospect of potentially failing and having to switch course. Yet, if learning from a mistake turns out to be the DS outcome, it is very unlikely that any CEO will wish he or she had not gotten that insight prior a big development or production investment.

Value in application: Design thinking

Where the DS, in its current format, is well-suited for more defined tasks, DT is aimed at wicked and complex problems in earlier stages of a development process.

As a broad field of knowledge, DT encompasses an array of perspectives on the practices, thinking styles, and principles of design, including generic process description. This field offers endless possibilities for designers to learn about and combine a unique sample of e.g., methods to tackle a particular, situated, complex problem, and hence design the process itself in accord with the context of application. Where all moves within the DS are determined in advance, a DT approach, free of strict schemes, can adapt to the continuous learning of the process and the shifts it can take. This is very valuable in the explorative process of solving a complex or wicked problem. The combinatory nature of both process design as well as idea development enhance creative value in the DS format.

DT process descriptions stress the initial phase of in-depth problem focus and research, which facilitates a thorough understanding of the problem's root causes and paradoxes and the possibility to reframe the problem. This is key when dealing with wicked problems, as the wickedness resides in exactly the paradoxes that has made the problem impossible to solve in the current understanding of it (Dorst, 2015).

With a co-design approach to design processes, DT promotes involvement of and interaction with users and other stakeholders, e.g., across organizational boundaries, in the design process and its generative activities. Visualizing and building (primarily) low-fidelity prototypes together can support the communication, help surface user needs, and become a 'playground' (Liedtka, 2015) for co-creation and experimentation, rather than a way of representing and validating nearly

finished design proposals. Hence, the co-creative approach is valuable in the earlier and more fuzzy stages of a design process, where the problem is more complex and ill- defined, and where problem research and explorative conceptual development is in focus.

Synergetic possibilities

The sprint book states that the DS can be used for any kind of project, and both as starting point, a boosting experiment, and a final spurt in a longer process – all with the purpose to quickly test ideas. Such range of application requires an approach that can serve very different purposes and tackle very different levels of problem complexity. However, I have found that the DS, in its current format, is best suited for more well-defined problems in later process stages.
Hence, for a process format to accommodate the need of at once being a simple and effective process recipe, and at the same being capable of addressing complex or wicked problems, it may be fruitful to investigate the space of potential synergy between the DS and DT.

Based on the findings of this article, I suggest the following measures to immediately enhance the adequacy of the DS in complex problem contexts:
Problem research: In a DT perspective, it will be advisable that the DS is preceded by a problem research phase, so that the hypothesis to be explored in the DS experiment may be more well-informed.
Align expectations: The DS cuts away complexity from the problem, but this may only be a problem if the DS is considered a one-time quick fix. Any local experimental move within a global problem context (Schön, 1983) will fail to deal with the entirety of that global problem at once.
Making the most of a DS in relation to a complex problem requires that expectations are aligned about the fact that the DS will not produce a final solution, but merely be one iteration out of several in a longer (DT) process. Likewise, the learning gained from the DS must be brought back to, and expand understanding of, the global problem context.

Team diversity: The DS team is typically not crossing organizational boarders. Yet, by inviting external stakeholders into the process, the diversity of perspectives, problem information, and ways of thinking and working is increased, which can enhance the problem space and produce more creative solutions and a broader set of possibilities (Hassi and Laakso, 2011; Liedtka, 2017).
Combinatory creativity: The DS typically works as an idea competition between individually developed ideas. Yet, since combination of ideas is key in creative processes, and innovation

builds on creativity (Amabile, 1996), the creative and innovative potential might be higher in a DS, if ideas are combined instead of selected.
User interaction: Finally, it may be valuable to aim for lower-level fidelity prototype and welcome the feedback of and conversations with users instead of a reaction test. This can help open up the problem space for further exploration.

For further research, I suggest that a study is undertaken to inform and substantiate the development of a differentiated DS model, which combines the value of the DS and DT by at once maintaining the effective qualities of the sprint and at the same time expanding the process and problem scope to embrace more fuzzy problems contexts. The purpose would not be a substitution of either the DS or DT approach, but rather a bridging addition to the methodological toolbox of future design thinkers and doers.

Findings compared

Correio and Fleury (2019) have also presented a comparative analysis of DS and DT, to which I shall compare the findings of this article, as I encountered it after writing most of this article. Correio and Fleury base their paper on a case study of three DS processes within one company. The processes are observed and afterwards six interviews are conducted with participants/ design experts.
Correio and Fleury take the Google DS by Knapp et al. (2016) to represent the DS concept. Seemingly, the concept of DT is represented by the interview respondent's individual conception of DT, represented by previous design processes in the company. The comparison between DS and DT is made on the basis of the interview respondents' perception of pros and cons of each approach. The main objective of the article is to "systematically analyze the DS process, based on the theoretical references of DT and LS [lean startup methodology], and to evaluate the practical differences of this type of process with others based only on DT and through the previous investigations to justify the importance of this method for companies that aim to increase assertiveness in the development of new products." (Correio and Fleury, 2019, p. 32).

Based on their investigation, Correio and Fleury emphasize three main results related to the value of the DS in comparison with DT (Correio and Fleury, 2019, p. 40):

- The DS represents a *Low barrier of experimentation* because it is a short, requires a

low investment, and is well-defined so anyone can carry out the process.

- The Alignment *with top management "ensures" the continuation of work* as the top management participants appoint solutions that align with the company objectives. This makes a project selection stage superfluous. This motivates the team and saves unnecessary resource spending.
- Through its focus on creating testable solutions and learn from them, the DS is *Oriented to incremental innovations* with lower risk as opposed to radical innovation. Incremental innovations are easier for start-ups to obtain and manage.

On basis of their findings, Correio and Fleury argue that DT processes are most useful in the 'fuzzy front end' of development processes, whereas the DS is most beneficially undertaken as an initial part of the subsequent product/ project development phase prior to actual development.
Correio and Fleury state that in order to "work on the solution of wicked problems, there is an evident need for the participation of experts who contribute great knowledge to the participants of the sprint, or that include a previous stage for the participants to understand unknown external variables, or even the generation of high-level ideas, as in DT processes" (p. 41).

Overall, the findings from this article corroborate those from Correio and Fleury (2019): I have also pointed to the DS as an easier and less costly way into experimentation; to the commercial viability of solutions ensured by participation of a Decider with authority in company; and to the point that a DS merely solves part of a bigger problem and can be seen as one iteration in a longer process. Additionally, the findings concur on the point that DT is generally more suited for dealing with complex problems in the beginning of a project, whereas the DS is most beneficially targeted at more well-defined problems later in the process.
Finally, the suggestions as to how to make the DS work for more wicked or complex problems coincides on one point: The need to focus on preceding problem research to be more externally informed before the DS.

Some differences between the two contributions are:
Where Correio and Fleury have elicited their findings from an empirical context with focus on perceived similarity and value, this article has based its finding on conceptual, theoretical comparison through extensive literature review.

Correio and Fleury base their analysis of the difference between the DS and DT on the situated 'new product development' context of their case study, and the theory (e.g., management and lean startup) related to it. Hence, they enhance findings related to management issues and company type. This article, on the other hands, draws – when departing from the literature taken to represent DS and DT respectively – primarily on the field of design and creativity theory to put findings into perspective. Thus, this article is more focused on processual movement and creativity aspects in the comparison. For example, I discuss issues of prototype fidelity level, combinatory creativity, co-creation, and process motion.

6. Conclusion

The increasing popularity of the rapid process format 'Design Sprint' (DS) as a way for primarily companies to quickly generate and test ideas has actualized the need for theoretical knowledge and conceptual clarity about the DS concept and its relation to the concept of DT, to which it is often compared.

In this article, I have made a structured, theoretically based, comparative analyses of the two concepts, with the aim to make clear the similarities and differences found between them. Based on this, I have pointed to the contexts of application in which they display most value potential.

I have found that the DS and DT display many similarities if viewed from a high abstraction, overall level, where e.g., diverse team collaboration, idea generation, and user testing recur. Additionally, I have found certain specific tools and method to coincide, e.g., sketching and mapping.

The most fundamental difference between DT and the DS is that DT is a broad field of design knowledge, whereas the DS is a particular process recipe. Apart from this, I have additionally found eight – more or less pronounced – aspects of contrast, by which the DS and DT can be distinguished. They are: *Part vs whole*; *Prescriptive vs descriptive*; *Structure vs content*; *Commerciality vs creativity*; *Important vs wicked problems*; *Framing vs reframing*; *Solution vs problem focus*; and *User-centered design vs co-design*.

On basis of the individual features of each approach, I have suggested contexts of valuable application of them:

The easy and efficient DS format, with its focus on important problems, effective and management-approved decision-making, high-fidelity prototyping and test is best suited for more well-defined,

less complex problem contexts. If the DS should be used in complex and ill-defined problem contexts, it should be preceded by a problem research phase, lower-fidelity prototyping should be used to engage users in generative conversation, expectations should be aligned about the fact that the DS will not produce a final solution, but merely be one iteration out of several, and learning from the DS should be brought back to inform understanding of the global problem.
The broad knowledge field of DT endorses continuous adaptation of design approach. The focus on problem research, reframing, user involvement through collaborative experimentation and low-fidelity prototyping helps understanding and solving of problem root causes and paradoxes.
Hence, DT is suited for ill-defined and complex problems contexts.

With the comparative analysis and findings presented, this article contributes both to a conceptual clarification of the concepts of the DS and DT as well as the relation between them.
Additionally, I propose contexts of application for each approach, relating to problem complexity and defined-ness, and hence, presumably, to process stages. This can aid designers, companies and others to choose the right approach for the right problem context.
By looking into the synergetic potentials in the space between the DS and DT, I suggest measures of adaptation to the DS that will help release a broader context of application of the format by means of DT values. This should be further substantiated in future research.

The article was motivated from a curiosity to investigate the claims that DS and DT are quite similar. The answer is that they are both similar and different. This paper demonstrates how and why they are both.

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Appendix 1

Procedure and findings of the DS review

In this review, I investigate the development and state of the DS in general and academic publications. The review contains three different branches of exploration I made of the DS-concept[10]: (1) Historical Google search data; (2) Search in General Publication; and (3) Search in peer-reviewed academic articles. I will explain only the method behind the last branch in detail. The three Figures below show graphs of the search results of the tree different branches of exploration of the DS concept.

Branch 1: Google search

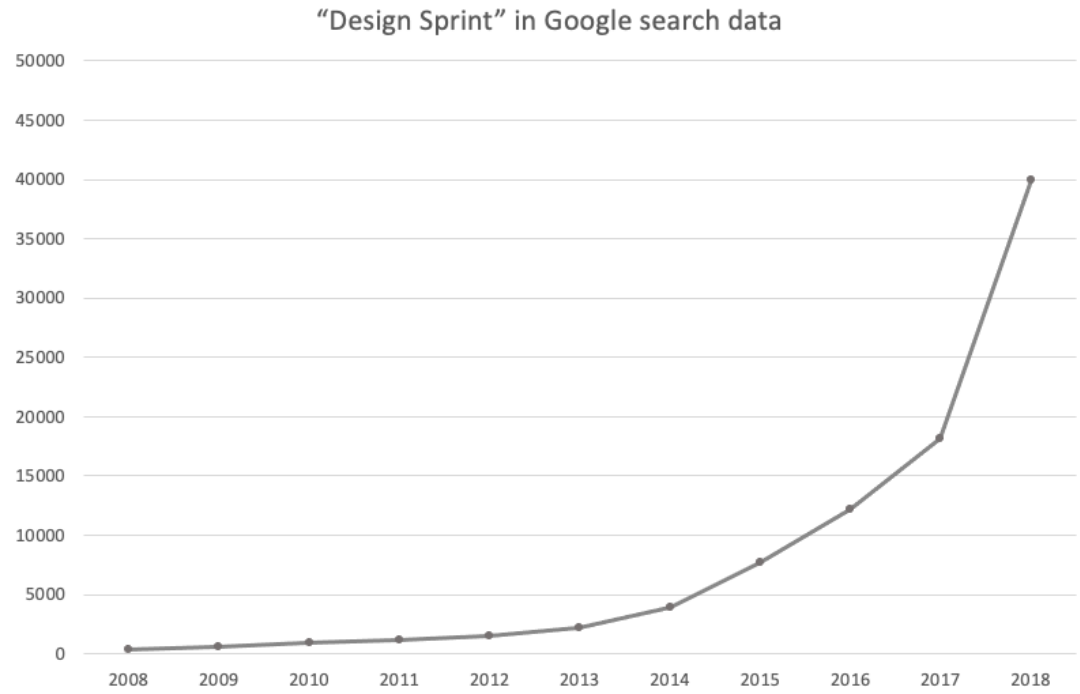

Figure 4: Number of Google search results including "design sprint", annually from 2008-2018

Branch 1 (Figure 4) shows the development in Google search results for data entries including the phrase "design sprint" from 2008 to 2018.

10. The searches represented in the tree branches were all carried out in January 2019.

Branch 2: General publications

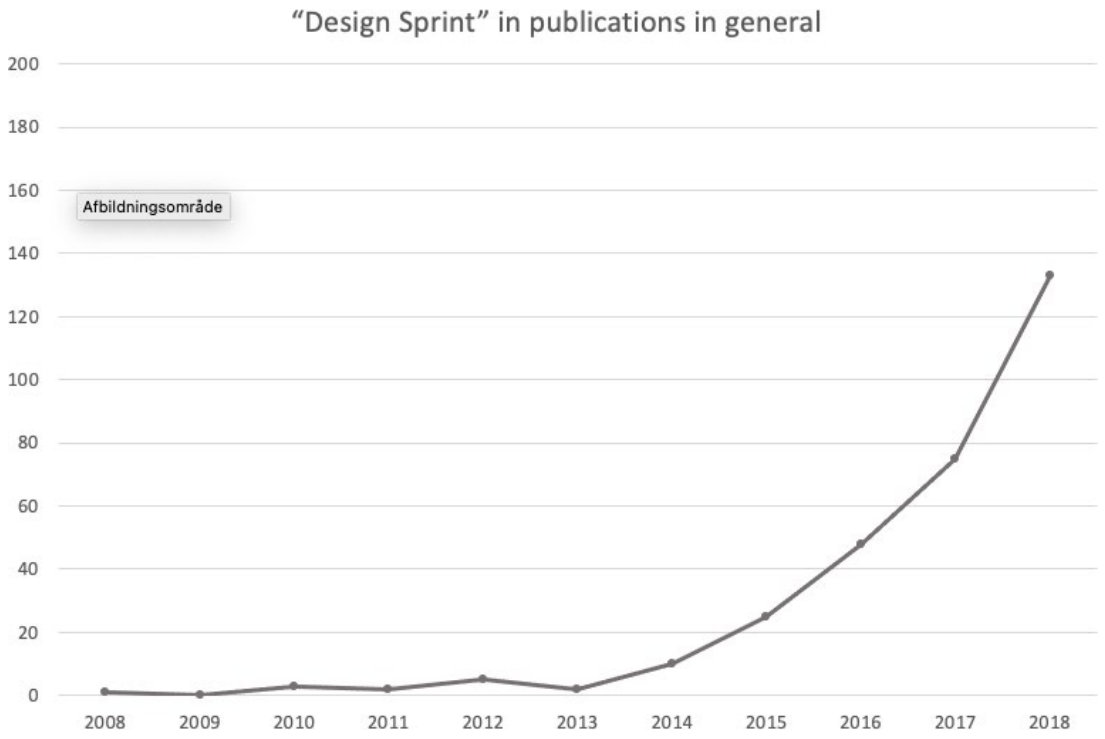

Figure 5: Number of general publications including "design sprint", annually from 2008-2018

Branch 2 (Figure 5) shows the development in number of 'general publications' including "design sprint" from 2008-2018. The search was conducted in 'Primo', the university library search engine of Aalborg University, Denmark. The 'Primo' search engine trawls across sub-branches for both physical and electronical material, including books, e-books, articles, newspaper articles etc.
Due to the limitation of scope, I will not elaborate further on the nature of these search results.

Branch 3: Peer-reviewed publications

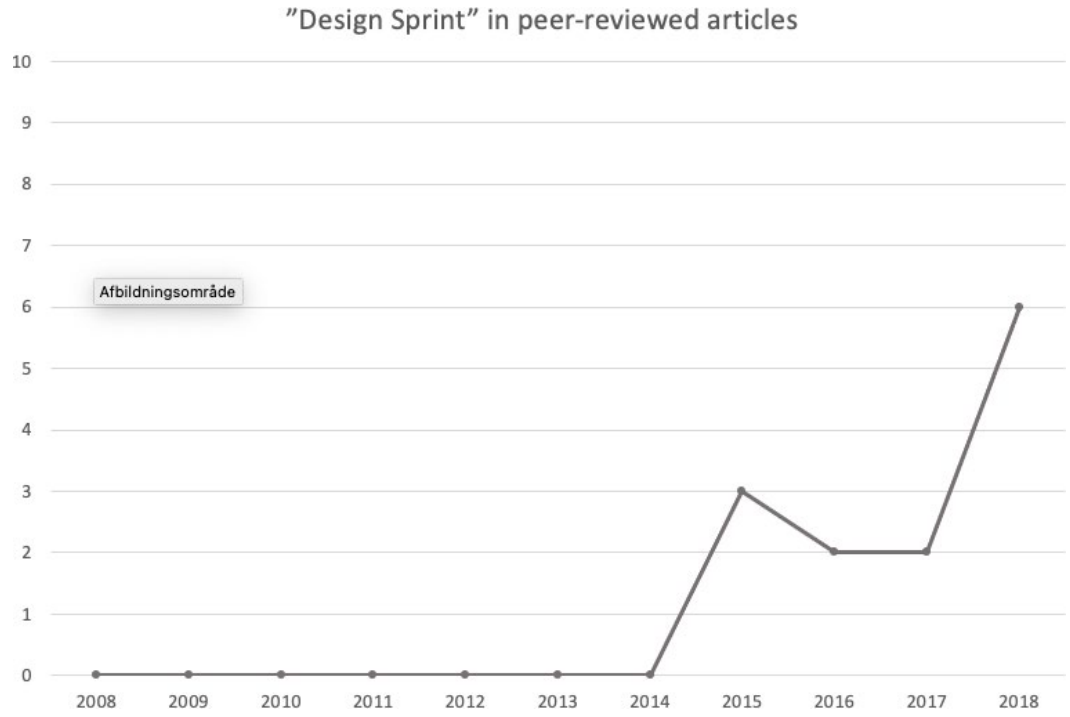

Figure 6: Number of peer reviewed articles including "design sprint", annually from 2008-2018

The third branch (Figure 6) of exploration into design sprints is a structured review of peer- reviewed articles on the concept of DS. Figure 6 shows the development in number of publications including "design sprint" from 2008-2018 after a qualitative assessment of the search results was conducted. In the following section, I will elaborate on the review method and the nature of the findings.

Method of the third branch: Review of academic research on Design Sprints

The third branch of exploration into design sprints is a structured review of peer-reviewed articles on design sprints. The procedure of the review on which Figure 6 builds was conducted by use of a protocol-approach trawling six different databases as shown in Table 8 combined with a qualitative assessment of the relevance of the search results.

The search for articles on design sprints was limited to exact phrasing, so that only search results in which the phrase "design sprint" without stop-words and punctuation in between were included.

The initial search results were qualitatively assessed so that results were excluded from the list if the mentioning of 'design sprint' was completely unelaborated and deemed unrelated to the general content of the article. For example, one article about the application of 'Mixed Reality' in learning factories included the phrase 'design sprint' in one sentence: "An exemplary structure for an MR training is shown in Fig. 5 based on a *design sprint* method (...)". This 'design sprint' method was not further elaborated, and the article was excluded from the result list. However, in order to capture as much as possible of the very limited academic literature mentioning the concept of 'design sprint', this exclusion-rule was used very cautiously. Thus, articles were included if the mention of 'design sprint' was specifically related to the GV design sprint, if it involved even just a short description of the nature or purpose of the mentioned 'design sprint', or if the core topic of the article was innovation, development strategies, or other topics related to aspects of design sprints,

e.g., 'prototyping'. In the latter case, the core topic could be considered a contextualization of the 'design sprint' mentioned, indirectly pointing to the value or purpose of the DS.
Likewise, articles in which the mentioning of 'design sprint' was found unrelated to the topic of 'design sprints' – understood as an approach to development processes – were excluded. For example, one article about traction features in sprint shoe sole spikes included the phrase 'design sprint' in one sentence: *"*The ability to *design sprint* shoe traction features that do not incorporate removable spikes provides greater design freedom (...)".

This search strategy resulted in a total of 13 peer-reviewed articles mentioning design sprints. Table 8 below shows an overview of the distribution of those articles across years and databases.

	Databases						
Year	DAAI	Ebsco Host	Emerald	JStor	Sage Journals	Science Direct (Elsevier)	**Sum**
- 2014	0	0	0	0	0	0	0
2015	0	1	0	0	0	2	3
2016	0	1	0	0	0	1	2
2017	1	0	0	0	0	1	2
2018	0	1	0	0	2	3	6
Total	**1**	**3**	**0**	**0**	**2**	**6**	**13**

Table 8: Overview of number and annual distribution of peer-reviewed articles including "design sprint" across databases

Besides the quantitative count of peer-reviewed articles including "design sprint" in the last decade, I have done a qualitative evaluation of the articles in terms of 1) how the design sprint is referred to/defined in the article, and 2) the nature of the findings of the articles from the search result.

The articles describe, define and refer to the concept of DS differently, as can be seen in Table 9 below. As can be seen from the number of occurrences, some of the articles employ more than one category of 'definition'.

Design sprint referred to/defined as	**Occurrence in articles**
Way to frame and understand problems	2
Design Thinking and/ or Human Centered Design	4
Design methodology	1
Design method/ process	5
Experimental, exploratory development technique	3

Table 9: Definition of Design Sprint

The examination of the findings showed that only three of the articles present findings that relate to design sprints, as shown in Table 10:

Author	**Year**	**Finding**
Shin & Thomas	2015	Sprints helped students increase collaboration, engagement, get past the process obstacles
Raubenolt	2016	2 hours devoted each day to the sprint was insufficient. Participants have a strong preference for the individual problem-solving inherent in the sprint model in combination with the intense and deadline-driven collaboration

Martinez, Threatt, Rosenbloom, Wallston, Hickson & Elasy	2018	The design sprint methodology is useful paired with mixed-methods, task-based usability testing to efficiently and effectively design a (specific) satisfying product

Table 10: Findings related to Design Sprint

Conclusion of review

In this review I have demonstrated that the three branches of exploration show similar patterns: There is a substantial rise in search hits from 2017. On this basis, I assume that the sprint book (Knapp, Zeratsky and Kowitz, 2016), the author of which is commonly considered the founder of the DS concept, did in fact cause the rise in interest and popularity of the DS concept.
I have shown that the academic literature on the field is very limited, and that in more instances DS are equaled to DT without any substantiation of the soundness of this juxtaposition. These arguments support the relevance of the study altogether, as well as the choice to use the sprint book, and the original five-day sprint format it offers, as the key literary source to represent the design sprint in the comparative analysis.

Appendix 2

Full list of DS components and thematic clustering of them

Theme headline			
1. Overall framework 2. Problem designation and nature 3. Mapping and framing the task 4. Decision-making 5. Team and collaboration 6. Condensation and concentration 7. Overview 8. Visualise by sketching 9. Data intake and analogy 10. Prototype and test			
Component	**Elaboration**	**Notes**	**Headline number**
Choose a big challenge	Where stakes are high, time is short, or you are stuck	In DS, the big challenge is described as the most important problem.	2
Get a Decider (or two)	Without a Decider, decisions won't stick	The Decider in a DS is the official decision-maker	4
Recruit a sprint team	Seven people or fewer. Get diverse skills and people who work on the project day-to-day	In the DS, a diverse team is central to the working process	5
Schedule extra experts	Plan interviews for Monday afternoon with experts who can't be in the sprint all week.	Look above	5
Pick a Facilitator	The facilitator manages time, conversations, and the overall sprint process.	Facilitator	1
Block five full days on the calendar	People must be in the same room.	Duration, time, compressing, coherent	6
Book a room with two whiteboards	One room for the entire week. A second (test)room for test Friday.	Place, room	6
No distractions	No laptops, phones, or iPads allowed	Disturbances	6
Timebox	A tight schedule builds confidence in the sprint process. A Time Timer creates focus and urgency	Time constraint	6
Plan for a late lunch	Take snack breaks around and lunch late to maintains energy and avoids lunch crowds.	--	1
Make a map and choose a target		Another difference is the level of problem 'archeology' that is promoted by the two concepts (DS/DT)	3
Introductions (abbreviated)	To schedule, team members, and sprint process	Knowledge in advance of what will take place, the order and how Preparation	1
Set a long-term goal	Ask optimistically: Why are we doing this project? Where do we want to be in x amount of time from now?	Goal, vision, the 'why', target	3
List sprint questions	Ask pessimistically: How could we fail? Turn these fears into questions you could answer this week.	Barriers, investigate	3
Make a map	Make a simple flowchart in between customers/key players on the left and completed goal on the right that shows customers/product interaction. 5-15 steps.	Map challenge	3
Ask the Experts	Interview team and external experts. 15-30 min each. Ask about the vision, customer research, how things work, and previous efforts. Update long-term goal, questions, and map as you go	See 'experts' above	5
How Might We notes	Reframe problems as opportunities. Start with the letters "HMW" in the corner of a sticky note. Write one idea per sticky note and make a stack during interviews.	HMW notes, rephrase potential problem as question/possibility	3
Organize *How Might We* notes	Stick *How Might We* notes on wall. Group similar ideas. Label emerging themes. 10 min.	Synthesis, getting things up	7
Vote on *How Might We* notes	Votes for most useful HMW's: Each person has two votes, can vote on his or her own notes, or even the same note twice. Move winners onto map.	Democratic vote	4
Pick a target	Circle most important customer and one target moment on the map. The team can weigh in, but the Decider makes the call.	Converge/zoom in on one part of the problem	4
Start at the end	Start by imagining your end result and risks along the way. Then work backward to figure out the steps you'll need to get there.	Backwards analysis, imagine goal ahead VS: when these steps are determined ahead of time the limits of one's imagination prior to the process of	3

		creation will influence what can be created in that process	
Nobody knows everything	Not even the Decider. The sprint team knowledge is locked in each person's brain. To solve the problem, this knowledge must be unlocked, and a shared understanding built.	Shared understanding, alignment, sharing knowledge	5
Reframe problems as opportunities	Listen carefully for problems and use "How might we" phrasing to turn them into opportunities.	VS: another way of using the reframing concept. It sounds more like rephrasing. The frame is a concept, so the frame comes more with a hypothesis of a solution context than with posing the question.	3
Sketch competing solutions		Sketching	8
Lightning Demos	Look at great solutions from a range of companies, including yours. Three minutes per demo. Capture good ideas with a quick drawing on the whiteboard.	Sourcing information from the outside, analogies, frames	9
Divide or swarm	Decide who will sketch which part of the map. If you're targeting a big chunk of the map in your sprint, divide it up and assign someone to each section. (p. 102)	Delegating work, split up work in functions, people do what they are best at	5
The Four-Step Sketch	Briefly explain the four steps. Everyone sketches. When you're done, place the sketches in a pile and save them for tomorrow. (p. 109)	--	8
	1. Notes 20 minutes. Silently walk around the room and gather notes.	Reviewing of questions, getting things up, overview Silence	7
	2. Ideas 20 minutes. Privately jot down some rough ideas. Circle the most promising ones. (p. 111)	Work individually	8
	3. Crazy 8s 8 minutes. Fold a sheet of paper to create eight frames. Sketch a variation of one of your best ideas in each frame. Spend 1 minute per sketch.	Time constraint on sketching, rough sketches	8
	4. Solution sketch 30-90 minutes. Create a three-panel storyboard by sketching in three sticky notes on a sheet of paper. Make it self-explanatory. Keep it anonymous. Ugly is okay. Words matter. Give it a catchy title.	Sketch in storyboard, temporal/process perspective, narrative	8
Remix and improve	Every great invention is built on existing ideas.	Mix ideas, creativity, combining ideas, cross-fertilization	4
Anyone can sketch	Most solution sketches are just rectangles and words.	The level of the sketches, rough, sketching expertise, sketching purpose	8
Concrete beats abstract	Use sketches to turn abstract ideas into concrete solutions that can be assessed by others.	Abstract, concrete, role of sketches	8
Work alone together	Group brainstorms don't work. Instead, give each person time to develop solutions on his or her own.	Group brainstorm, individual work	5
Decide on the best (solution idea)		Decision	4
Sticky decision	Follow these five steps to choose the strongest solutions:	Voting with stickers, visual democratic vote	4
	1. Art Museum Tape the solution sketches to the wall in one long row.	Getting things up, overview	7
	2. Heat map Have each person review the sketches silently and put 1-3 small dot stickers beside every part they like.	Democratic influence on decision	4
	3. Speed critique 3 minutes per sketch. As a group, discuss the highlights of each solution. Capture standout ideas and important objections. At the end, ask the sketcher if the group missed anything.	Discussion, check understanding of ideas	7
	4. Straw poll Each person silently chooses a favorite idea. All at once, each person places one large dot sticker to register his or her (nonbinding) vote.	Vote at once, not influencing each other's choice	4
	5. Supervote Give the Decider three large dot stickers and write her initials on the sticker. The deciders choice determines which solution will be prototyped and tested.	The decision maker makes choice	4
Divide winners from "maybe-laters."	Move the sketches with supervotes together. (p. 141)	Get rid of information that has not been chosen, update board	4

Rumble or all-in-one	Decide if the winners can fit into one prototype, or if conflicting ideas require two or three competing prototypes in a Rumble. (p. 145)	Can ideas be combined?	4
Fake brand names	If you're doing a Rumble, use a Note-and-Vote to choose fake brand names. (p. 145)	?	4
Note-and-Vote	Use this technique whenever you need to quickly gather ideas from the group and narrow down to a decision. Ask people to write ideas individually, then list them on a whiteboard, vote, and let the Decider pick the winner. (p. 146)	?	4
Make a storyboard	Use a storyboard to plan your prototype	Storyboard, process, temporal	10
	1. Draw a grid About fifteen squares on a whiteboard.		10
	2. Choose an opening scene Think of how customers normally encounter your product or service. Keep your opening scene simple: web search, magazine article, store shelf, etc.	Customer experience	10
	3. Fill out the storyboard Move existing sketches to the storyboard when you can. Draw when you can't (?), but don't write together. Include just enough detail to help the team prototype on Thursday. When in doubt, take risks. The finished story should be 5-15 steps.	Break down process	10
Build a realistic prototype		Prototype	10
Pick the right tools	Don't use your everyday tools. They're optimized for quality. Instead, use tools that are rough, fast, and flexible. E.g., 'Keynote'.	Use flexible tools, non-quality	10
Divide and conquer	Assign roles: Maker, Stitcher, Writer, Asset Collector, and Interviewer. You can also break the storyboard into smaller scenes and assign each to different team members.	Team roles, divide jobs	5
Prototype!		Build	10
Stitch it together	With the work split into parts, it's easy to lose track of the whole. The Stitcher checks for quality and ensures all the pieces make sense together. (p. 189)	?	10
Do a trial run	Run through your prototype. Look for mistakes. Make sure the Interviewer and the Decider see it. (p. 189)	Check prototype	10
Finish up the prototype		--	10
Write interview script	The Interviewer prepares for Friday's test by writing a script.	Interview script, interview technique, qualitative methods, user test, UX research	10
Remind customers of test and buy gifts (abbreviated)	Email is good, phone call is better. E.g., gift cards.	–	10
Prototype mindset	You can prototype anything. Prototypes are disposable. Build just enough to learn, but not more. The prototype must appear real. (p. 168)	Prototype diversity, types, surface, fidelity	10
Goldilocks quality	Create a prototype with just enough quality to evoke honest reactions from customers. (p. 170)	Fidelity, reaction VS feedback (co-creation)	10
Test with targeted customers		Test VS co-creation	10
Makeshift Research Lab: Two rooms	In the sprint room, the sprint team will watch a video feed of the interviews. You'll need a second, smaller room for the actual interviews. Set up hardware and video stream (abbreviated)	Location of test	7
Before the First Interview: Draw a grid on a whiteboard.	Create a column for each customer. Then add a row for each prototype or section of prototype. (p. 219)	Collection of test data, documentation of test data	7
Interview	Meanwhile, in the sprint room, the team watches the interviews over a live video feed and takes notes on sticky notes: direct quotes, observations, and interpretations. Indicate positive or negative.	Collect data, observe test	7
After Each Interview: Stick up notes.	Stick your interview notes in the correct row and column on the whiteboard grid. Briefly discuss the interview but wait to draw conclusions. (p. 220)	Organize data	7
Look for patterns	At the end of the day, read the board in silence and write down patterns. Make a list of all the patterns people noticed. Label each as positive, negative, or neutral. (p. 222)	Synthesize, find patterns in data	7
Wrap up	Review your long-term goal and your sprint questions. Compare with the patterns you saw in the interviews.	Evaluate test data against goal and question	7

	Decide how to follow-up after the sprint. Write it down. (p. 222)		
Five is the magic number.	After five customer interviews, big patterns will emerge. Do all five interviews in one day. (p. 197)	Number of test persons	10
Watch together, learn together.	Don't disband the sprint team. Watching together is more efficient, and you'll draw better conclusions. (p. 218)	Shared learning, triangulation of insights	5
A winner every time.	Your prototype might be an efficient failure or a flawed success. In every case, you'll learn what you need for the next step. (p. 223)	Learn from failure, fail fast	10

Appendix 3

Procedure of DT review

The review of academic DT literature was done by a combining a protocol-driven method (a purposeful, structured search approach determined at the outset) with a 'snowballing' method (where the search strategy is emerging along with the undertaking of the study).
The search for this review was conducted across 6 databases (see Table 11). First a quantitative search (Review round 1) was carried out by a Boolean search for "design thinking" in 'title' AND "review" in 'abstract'. When possible from the database search limiters, the search was limited to peer reviewed articles in academic journals and to English language. As the Science Direct (Elsevier) database does not provide a Boolean search function similar to the other databases, two different search tactics were applied in this database to make sure all content was searched. One involved searching the category 'Review papers' by the keywords 'Design Thinking' and 'Review'. The other involved searching in all articles for 'Design Thinking' in title and ''Review' in 'Title, abstract or author-specified keywords'. The two search tactics resulted in two duplicate articles from this database. In Table 11 the number of articles displayed from the Science Direct (Elsevier) database is the number of unique articles from the two search tactics combined. The quantitative search (Review round 1) resulted in a number of articles (see Table 11). There was one cross- database duplicate article which occurred from the search in both the Ebsco Host and the Sage Journals databases.

Review round one was supplemented by 6 articles which had not appeared in the protocol-driven search, but which were already known by the author to be relevant to the concept of design thinking as well as the purpose of the review. This collection of articles is named 'other sources' in Table 11.

The search result from the Review round 1, including the six articles form 'other sources', was subsequently limited by a qualitative assessment (Review round 2) of the relevance of the articles in relation to the purpose. This assessment was done by reading the abstracts of the articles and screening them on basis of the following criteria: Articles in which the topic or review did not focus specifically on the concept of 'design thinking' were excluded. For example, several articles focused on specific applied areas of DT rather than the concept of 'design thinking' per se. These applied areas were e.g., healthcare, education, childcare, demography, aesthetics or specific design domains such as 'design of dashboards'. Also, despite the attempt to limit results to peer reviewed articles in the quantitative search, many book reviews appeared as part of the search. Those were also excluded. The assessment in Review round 2 resulted in a drastic limitation in the number of articles (see Table 11).

Finally, all remaining articles from Review round 2 were read through in Review round 3 for an in-depth examination of their qualitative relevance to the review purpose.
This read-through resulted, by a snowballing-approach, in a further addition of 12 articles to the literature review, which were mentioned and referenced as review papers on 'design thinking' in the articles already found. These were also included and assessed in the read-through.

In the read-through, articles were excluded if they did not, despite what was stated in the abstract, review the concept of design thinking. For example, one article claimed to be contrasting paradigms of design thinking, however, it did in fact compare two specific approaches to designing buildings, and the relation between these approaches and the concept of 'design thinking' remained assumed and implicit throughout the article. Another article about parametric design claimed to review the

evolution of models of design thinking, however, this article focused only on a specific branch of such evolution, namely the historical development from hand-drawn design to parametric design without focusing particularly on the concept of design thinking or its meaning. Also here, the relation between the concepts of 'design' and 'design thinking' remained assumed or implicit. Likewise, articles were excluded if their 'review' of DT constituted only a brief description of the concept or minor part of the article without any independent analysis or category-synthesis.

The assessment in Review round 3 resulted in a slight increase of articles due to the snowballing approach (see Table 11).

	Number of articles	Number of articles	Number of articles
Database	**Result of Review round 1**	**Result of Review round 2**	**Result of Review round 3**
DAAI	10	2	2
Ebsco Host	36	5*	3*
Emerald	0	0	0
JStor	0	0	0
Sage Journals	33	1*	1*
Science Direct (Elsevier)	58	3	2
Other sources	*6*	*6*	*13***
Total (without duplicate)	**143**	**16**	**20**
		*One duplicate	*One duplicate

** 12 articles were added by a snowballing-approach during the read through in Review round 3. After having read and assessed these 12 articles, seven of them were included in the result, summing up to a total of 13 articles from 'other sources'.

Table 11: Review of DT literature

The articles resulting from 'Review round 3' are the articles found relevant to the review purpose. This pool of articles is taken to represent the 'DT literature' in this article, and serves as the basis for the comparison with the DS. A list of the final articles can be found in Appendix 4.

Appendix 4

List of articles from review of DT literature

Article number	Author(s)	Year	Title	Journal
1	Robert M. Bauer, Ward M. Eagen	2008	Design Thinking – Epistemic plurality in Management and Organisation	Aesthesis
2	Ulla Johansson, Jill Wodilla	2010	How to avoid throwing the baby out with the bath water: An ironic perspective on design thinking	Conference paper (Waves of Globalization: Repetition and difference in organizing over time and space)
3	Lotta Hassi, Miko Laakso	2011	Design thinking in the management discourse: defining the elements of the concept.	Conference paper (18th international product development management conference, Innovate Through Design)
4	Lucy Kimbell	2011	Rethinking Design Thinking: Part I	Design and Culture
5	Olgu Calıskan	2012	Design thinking in urbanism: Learning from the designers	Urban Design International
6	Lucy Kimbell	2012	Rethinking Design Thinking: Part II	Design and Culture The Journal of the Design Studies Forum
7	Katja Tschimmel	2012	Design Thinking as an effective Toolkit for Innovation	Proceedings of the XXIII ISPIM Conference: Action for Innovation: Innovating from Experience. Barcelona
8	Ulla Johansson-Sköldberg, Jill Woodilla, Mehves Çetinkaya	2013	Design Thinking: Past, Present and Possible Futures	Creativity and Innovation Management
9	Massimo Garbuio, Dan Lovallo, Joseph Porac, Andy Dong	2015	A Design Cognition Perspective on Strategic Option Generation	Cognition and Strategy, Advances in Strategic Management
10	Jeanne Liedtka	2015	Perspective: Linking Design Thinking with Innovation Outcomes through Cognitive Bias Reduction	Journal of Product Innovation Management
11	Lisa Carlgren, Ingo Rauth, Maria Elmquist	2016	Framing Design Thinking: The Concept in Idea and Enactment	Creativity and Innovation Management
12	Roy Glen, Christy Suciu, Christopher Baughn	2016	The Need for Design Thinking in Business Schools	Academy of Management Learning and Education
13	Jeanne Liedtka	2017	Exploring the impact of design thinking in action	Darden Working Paper Series
14	Dan-Ling Zheng	2017	Design thinking is ambidextrous	Management Decision
15	Maaike Kleinsmann, Rianne Valkenburg, Janneke Sluijs	2017	Capturing the Value of Design Thinking in Different Innovation Practices	International Journal of Design
16	David C. Chou	2018	Applying design thinking method to social entrepreneurship project	Computer Standards and Interfaces
17	Kimberly D. Elsbach, Ileana Stigliani	2018	Design Thinking and Organizational Culture: A Review and Framework for Future Research	Journal of Management
18	Massimo Garbuio Dan Lovallo,	2018	DEMYSTIFYING THE GENIUS OF ENTREPRENEURSHIP:	Academy of Management Learning & Education

	Andy Dong, Nidthida Lin, Ted Tschang		HOW DESIGN COGNITION CAN HELP CREATE THE NEXT GENERATION OF ENTREPRENEURS	
19	Ricardo J. Hernández, Rachel Cooper, Bruce Tether, Emma Murphy	2018	Design, the Language of Innovation: A Review of the Design Studies Literature	She Ji
20	Pietro Micheli, Sarah J. S. Wilner, Sabeen Hussain Bhatti, Matteo Mura, Michael B. Beverland	2018	Doing Design Thinking: Conceptual Review, Synthesis, and Research Agenda	Journal of Product Innovation Management

Adaptive Sprint model: Differentiating Design Sprints to a diverse SME context

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Abstract

The Design Sprint (DS) is an increasingly popular phenomenon among companies to approach development of new business ideas and solution. It is a condensed design process format aimed at effectively generating and testing ideas in short time. The government-funded Danish design driven business development programme, Sprint Digital, is centred around the use of DSs to help small and medium sized enterprises (SMEs) develop digitally. The research presented in this paper is conducted as part of the qualitative research accompanying this programme.

In this research, many instances and different types of 'misfit' were discerned, in which the DS format did not seem to comply with the needs and wishes of the various companies. Some of these misfits seemed to relate to the scope and openness of the DS task. This paper scrutinizes the nature of 'misfits' encountered in sprint processes and the relation between misfits and the scope and openness of the task and suggests way they can be countered. The purpose is to explore how the DS format can be adapted and differentiated for the diverse SME context, while maintaining the qualities that make it popular.

This paper first presents an empirically based analysis of 'misfits' between the DS format and the tasks and needs of nine case companies enrolled in the Sprint Digital project. Based on this analysis, as well as on a framework previously developed as part of the accompanying research, which distinguishes different levels of task openness, the paper proposes the Adaptive Sprint Model – a differentiated DS model. The model can be used to direct and target DSs to different tasks and needs, hence expanding the range of application of DSs.

Keywords

Design Sprint; Small and Medium-sized Enterprises; Design-driven Business Development; Design Thinking

1. Introduction

In the later years, the 'Design Sprint' (DS) has gained increasing attention and popularity as a way to spark development processes (Correio & Fleury, 2019). The DS is a condensed, rapid design process format, in which a cross-functional team collaborate to define a problem, generate ideas, build a prototype, and test it with users in just five days. The DS was developed by Jake Knapp at Google to increase efficiency in team collaboration, creative development and decision making. In 2016, the DS was described and published in the book "Sprint – how to solve big problems and test new ideas in just five days" by Knapp and colleagues (2016)[3]. Since then, the DS has been adopted and adapted by many design agencies and companies (e.g., AJ&Smart and the Design Sprint Academy) as a recipe to fast failing, learning and success in development projects. Yet, the main reference for all of them is the 'Google Design Sprint' (Correio & Fleury, 2019), which will be explicated in section 2.1.

The DS provides inherent qualities for companies going through development processes. Among other things, it is a simple, effective, focused and facilitated process that leads quickly to clarification of needs, new ideas and solutions (Bordal, 2021b) and it de-risks development processes by testing e.g. desirability of ideas, before they are built (Knapp et al., 2016). This is especially important to SMEs who are often busy with daily operations and have sparse resources for development activities (Klyver et al., 2017).

Yet, at the same time, the DS, as presented in the sprint book, is a recipe-like, predefined step-by-step guide, specifying in detail what exercises to do in what order. Because of the meticulous and predefined character of the DS, not all kinds of tasks[4] are equally compatible with it. Bordal (2021a) has found that the DS format can conflict with the diverse tasks and needs of Small and Medium-sized Enterprises (SMEs), and that such conflicts can relate to the openness of the task, i.e. how well- or ill-defined the task is at the outset of the DS. For example, in an initial and open project, it can be a challenge to frame the task sufficiently to fit the DS format. And in a later-staged project with a more well-defined DS task, more explorative DS elements may seem redundant (Bordal, 2021a, s. 2–3).

[3] For the sake of ease, this book is referred to as the 'sprint book' in the remainder of the paper

[4] In the paper, the term 'task' is used rather than '(design) problem' or 'project'. The term 'task' is deemed more inclusive than 'problem', as it includes both DS tasks based on identified 'problems' as well as tasks motivated by, for example, the desire to explore new possibilities. And it acknowledges that design sprint tasks are often part of larger projects, that stretch beyond the scope of the DS.

The purpose of this paper is to scrutinize and determine what types of conflicts and 'misfits' can be found between the DS format on the one hand and the SMEs tasks and needs on the other. And to explore how the DS format, with its inherent qualities, can be adapted and redesigned for the needed differentiation in the diverse SME context.

The paper is based on an empirical study from research on the Sprint Digital project, a 3-year Danish design-driven business development program, aimed at strengthening digital development in Danish SMEs. The project was funded by the Danish government as part of a national digitalization strategy. The core activity for companies taking part in the project were DSs, and additionally, the companies gained access to subsequent consultancy sessions. Over the course of the three-year project[5], 132 SMEs from various industries have carried through one or more DSs by facilitation from professional Danish Design Agencies.
The Sprint Digital project has been accompanied by qualitative research by the author, in which nine company cases were followed in their 'journey' through the project activities to gain insight to the value gained and barriers encountered in relation to the DS format from a company perspective.

As part of the Sprint Digital research endeavour, a tool/model has been developed called the 'Task Ladder' (Bordal, 2021a) (see section 2.2). The model distinguishes four different 'task levels' that represent different degrees of scope/ openness in a task and provides characterization of the task at the different levels. The model was developed inductively from data as a response to the initial finding that companies' needs and struggles seemed to vary dependent on how open or closed the DS task was formulated.

Using the Task Ladder tool as an analytical lens, this paper addresses the following questions:

- For design sprinting SMEs, what types of challenges, conflicts and 'misfits' are associated with the DS format?
- How do the conflicts and misfits relate to task levels as represented in the Task Ladder?
- On basis of investigating the questions above, what kind of adaptations and differentiations to the DS format could be proposed to maintain DS qualities while meeting different needs of diverse tasks?

[5] Running from 2018 - 2021

The paper is initiated with a theoretical part introducing more in-depth the DS and the Task Ladder framework, followed by an account of the empirical data. After this, the paper introduces the research process in three distinct parts, representing the three research questions. In each of these parts, the method and findings are individually presented. Part 1 identifies and presents misfits from data and part 2 analyses misfits based on the Task Ladder. Based on the findings from part 1 and 2, part 3 synthesizes a concrete way to make the insights applicable by proposing the Adaptive Sprint Model, which differentiates the DS format for different task and needs. After a discussion of the model, the contributions of the paper are summarized in a short conclusion.

2. Theoretical ground

This section will explicate the theoretical foundations for the work in this paper: The DS format (Knapp et al., 2016) and the 'Task Ladder', on which the Adaptive Sprint Model builds.

2.1. The Design Sprint

The DS is a condensed design process format created to help companies quickly develop, build and test ideas with users. In the DS, a diverse team from the company collaborate across e.g. departments, roles and areas of expertise to solve problems or generate new possibilities, concepts or products. It was originally developed by Jake Knapp and his colleagues at Google, and later Google Ventures, as a way to increase efficiency and productivity in team collaboration on solving problems and developing new ideas. According to Knapp (2016, s. 26), the DS can be used to kickstart a longer process, for a final sprint up against a deadline, or as a catalyst for progress when a process is stuck.

In the DS, a diverse group of people, typically from within a company, work together across departments, professional background, and competences to solve problems or create new opportunities, concepts, and products.
The DS stretches over five days of focused work on a chosen challenge. The five days represent five short process phases (see descriptions below). The DS format prescribes certain exercises and an order of them, which in combinations make up the mechanisms of progress in the DS. It is the job of the DS facilitator to steer the group safely through these exercises and thereby secure the progress (Knapp et al., 2016, s. 36).

In the DS, decisions are made by use of 'dot-voting' – a method by which group decisions can be made fast without discussion by voting visually on generated ideas by use of dot stickers (Knapp et al., 2016, s. 80). Thereby, the collective opinion is marked and can be used as a foundation for a final decision. The final decision is made by the 'Decider' – a person who has the mandate to make decisions in the company, e.g., the CEO or other leader. The purpose of this role is to secure that what is developed in the DS aligns with the company strategy and is not subsequently overruled, but can in fact be realised (Knapp et al., 2016, s. 30).

The purpose with the DS is to gain quick learning and insights about the merit of an idea before investing resources in longer development and production processes. Thereby, the DS can help reduce risk for companies in relation to new projects that inherently involve uncertainty (Knapp et al., 2016, s. 15–16).

The DS draws on principles and methods from the field of knowledge and practice of design thinking. Examples of this is the experiential approach in which an idea is given provisional form through prototyping to test it with users; the interdisciplinary team collaboration, visualization as the cornerstone in idea generation; and the use of analogies as sources of inspiration (See e.g. Garbuio et al., 2018; Micheli et al., 2018a). Even though it is not explicitly stated in the DS method description, the DS likewise occasions an *iterative* development in which insights from testing ideas feed into and give direction to the further process (Knapp et al., 2016, s. 26).

Figure 1 depicts the five days and phases of the DS.

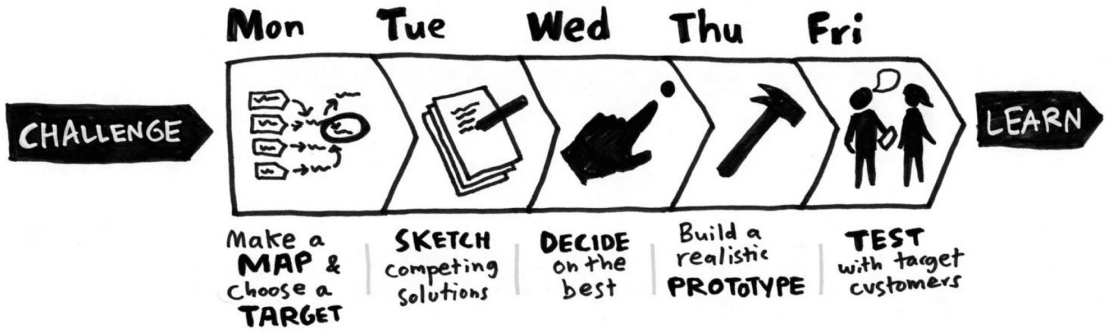


Figure 1: The Design Sprint (Knapp et al., 2016)

Day 1 (Monday): The challenge is mapped and encircled. Exercises are:

- Defining a long-term goal and a list of sprint questions regarding potential barriers to achieving the goal.
- Mapping the (user) journey of interaction with the expected service/ product from the DS.
- 'Ask the experts' + 'How might we': Experts are invited in for inputs to the challenge. The

team writes 'How-might-we'-notes (HMW) – notes on how they might solve the issues or meet the needs pointed out by the experts.

- Organizing HMW notes thematically and dot-vote for the most useful HMW notes/ questions.
- The Decider picks a target and a sprint question from the list on which to focus the DS.

Day 2 (Tuesday): Day 2, the team sketches solution ideas. Exercises are:

- 'Lightning demos': The team find and present inspiration from similar problems in different fields and environments.
- 'Four-step sketch': The four-step sketching exercise for generating solution ideas consists of 1) gathering information from all previous exercises, 2) doodling rough solution ideas, 3) 'crazy 8' – eight rapid sketch variations in eight minutes, and 4) detailed solution sketches.

Day 3 (Wednesday): Deciding on a solution concept. Exercises are:

- Displaying solution ideas on the wall as an 'art museum' and using dot votes to create a heat map of interest.
- Speed critique of solution ideas and 'straw poll' vote where each person dot vote for one solution.
- Decision maker makes the final dot vote, which determines the decision.
- Creating a storyboard: A cohesive story flow of sketches that represents user interaction with the solution and serves as a plan for the prototype.

Day 4 (Thursday): Building a prototype of the solution concept. Exercises are:

- The team divides tasks between them and build a realistic appearing prototype using simple and quick tools, e.g., Keynote.

Day 5 (Friday): Testing the solution concept, represented by the prototype, with users/ customers. Exercises are:

- Interviewing users, asking questions before, whilst, and after interacting with the prototype.
- Learning: During user tests, the rest of the team watches (on video from another room)

and takes notes.

- Organizing notes in a grid, finding patterns, and making sense of the data.
- Reviewing long-term goal and sprint questions. Deciding how to follow up after the DS.

2.2. The Task Ladder

The Task Ladder framework was developed as part of the research on the Sprint Digital project. The starting point for the task ladder was empirical observations of the case company DS processes, which indicated that that the stringent format of the DS may conflict with the tasks of the participating companies and thus their needs. This 'conflict' seemed to look different depending on the scope of the task, i.e., its openness and closedness. This incentivized the exploration and analysis of different DS task levels as well as the characteristics and needs associated with them. This analysis resulted in the creation of the Task Ladder framework (Bordal, 2021a).

Based on the nine cases as well as a further analysis of task descriptions of 30 participating companies, the Task Ladder depicts four different levels that the companies' tasks can take at the outset of a DS. The levels are represented in the model by generalized statements about the incentive to sprint, see Figure 2.

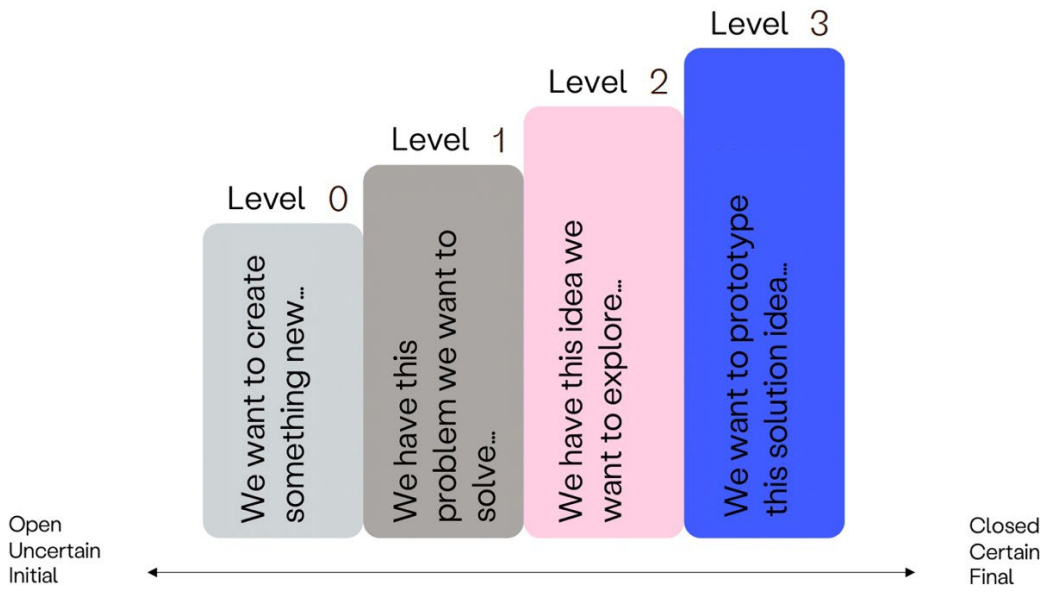


Figure 2: The Task Ladder (Bordal, 2021b)

The levels on the Ladder are an expression of the task's degree of openness, where Level 0 is most open, and Level 3 is most closed. The degree of openness of the task can at the same time be an expression of how the progression of the development process of which the sprint task is part. Thus, a Level 0 task will often represent the beginning of a longer (innovation) process, while a Level 3 task, based on a preceding process, will represent a process state closer to the goal.

A DS can be initiated from any of the Task Ladder levels, but since the DS only lasts five days, it cannot be expected that the same level of progress can be reached within those days regardless of the task level at the outset.

Hence, the Task Ladder suggests that each of the levels are associated with and addresses different focus questions for the investigation or experiment that the DS represents. Consequently, the result of DSs at the different levels will also have different character. Level 0 will typically focus on *why* something new is to be developed, and the result can be an understanding of the task and how it might be approached, including strategy and method; Level 1 focuses on *how* the task is to be framed and approached, and the result can be the development of concepts and solution ideas; Level 2 focuses on *what* a solution must consist of and contain in order to meet the criteria, and the result can be a concrete solution proposal; and finally, Level 3 does not to the same extent involve a question to be investigated, but rather focuses on refining and concretizing a solution proposal in a prototype. The question of the process is rather tied to the test in which the solution is to be tried.

Figure 3 illustrates that there may be different DS process levels with different investigative foci and different types of unknowns for which answers are sought.

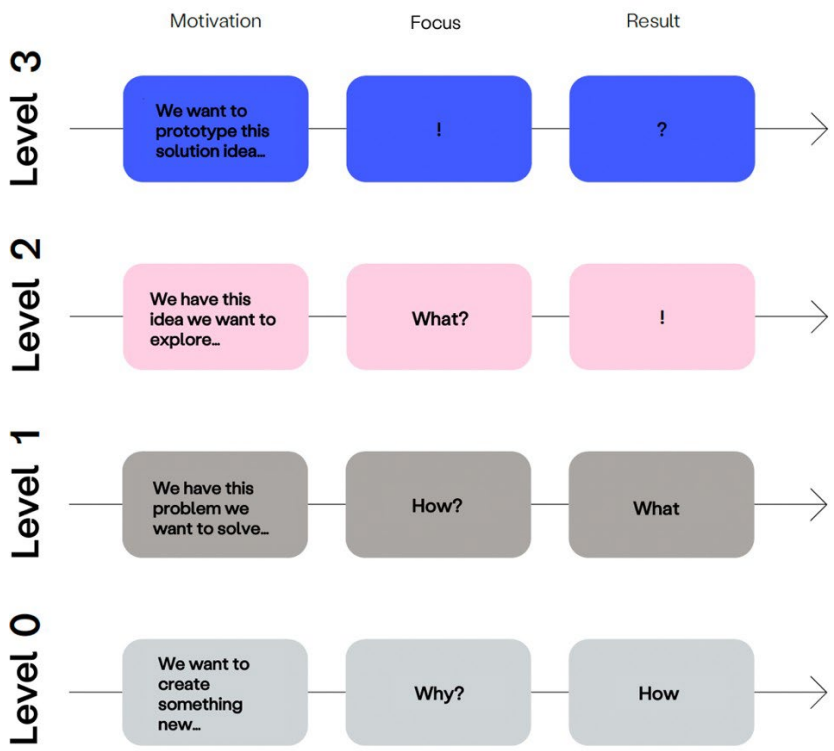


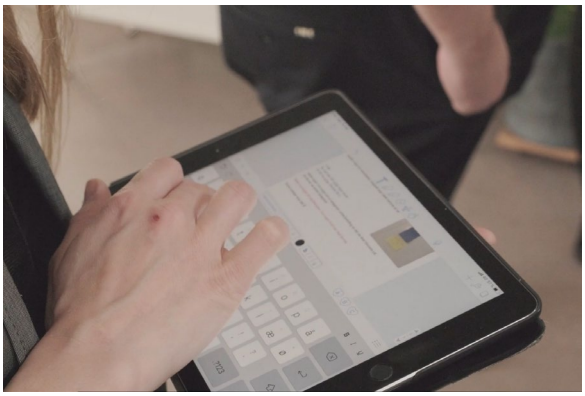
Figure 3: The Task Ladder: Different focus questions and results (Bordal, 2021b)

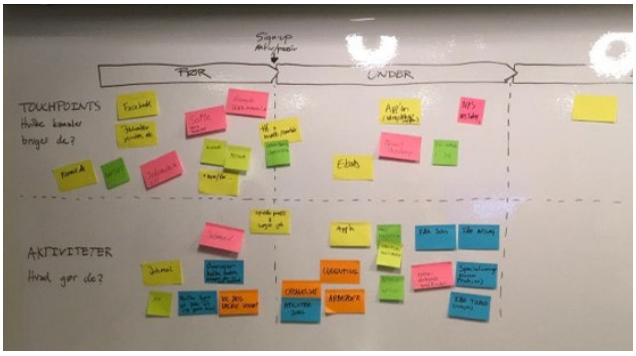
The task ladder does not suggest that a DS will or should stick strictly to the described focus, nor that tasks should not be challenged or reframed by asking lower-level questions. Rather, the purpose of the framework is to make visible that the starting points of companies' DSs vary, and, accordingly, so do the questions they may need to answer in the process and the nature of results they can expect to achieve. Hence, the task ladder offers a language for talking about development stages in design processes and can help to align expectations of what a company can get out of a DS, track progress in long-term processes and plan future design processes (Bordal, 2021a, s. 15).

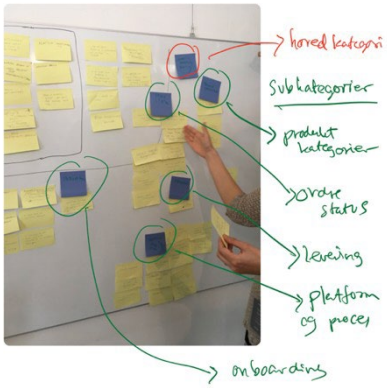
3. Empirical data

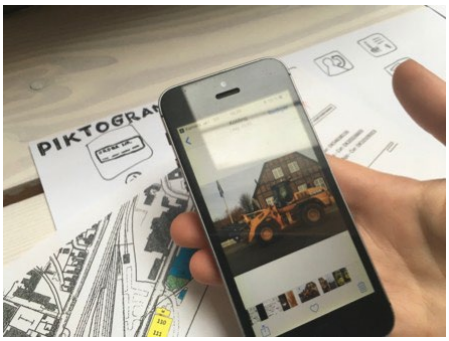
As previously described, the research presented in this paper is part of the accompanying research on the Sprint Digital project. It is based on a qualitative, embedded multi-case study of 9 enrolled SMEs and their participation in a DS through the Sprint Digital project. The cases have been studied by separate in-depth interviews with the companies (with the DS Decider – often the CEO or a company Partner) and the DS facilitators before and after the DS, and participant observation and small interviews with the DS team and facilitators throughout the entire DS. During the DSs (after each day), sprint team members were also asked to draw 'user journey' mood curves representing

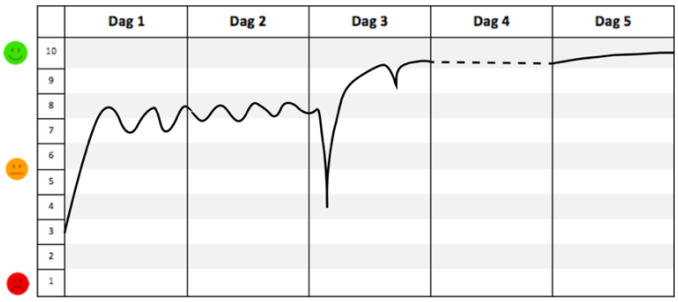
their experiences with the activities during each sprint day, and these were used as a basis for small qualitative interviews to explain ups and downs. Additionally, written project descriptions, and other relevant documents, e.g., emails, have been collected. The data thus consists of a mix of transcribed interviews, field notes and photos, and documents.











The research for this paper has three iterative parts representing the three research questions. For each part, method and findings will be individually presented in the following

4. Research Part 1: Misfits between DS format and SME tasks and needs

Research part 1 addresses research question 1: For design sprinting SMEs, what types of challenges, conflicts and 'misfits' are associated with the DS format?

4.1. Method

In the Sprint Digital project, the understanding of the DS concept is based on the Google DS format. However, as the DSs in the project are in practice facilitated by an array of different professional agencies with different unique competences, and targeted at different companies, a certain degree of methodological freedom has been allowed and necessary. However, it is a formal delivery requirement on the part of the facilitating agencies that they ensure companies go through the distinct DS phases and achieve the individual sprints days' output, as described in the Google DS format. Moreover, the DS should still target a specified challenge, be time-limited with consecutive sprint days, and feature a cross-functional sprint team from the company including a Decider.

Because of the methodological freedom, there has been no 'constant' based on which to compare DSs and thus find valid patterns between them.
For this reason, an additional analytical step has been inserted, so that every encountered instance of misfit has first been measured against a common benchmark, namely the original Google DS format.

When the data set features nine interpretations or variations of the DS format, this additionally affects how the concept of a 'misfit' between the task and the Google DS format could be construed:

1. It can be a situation during a DS, in which the activity in question aligns with original Google DS format AND in which there is a misfit or discrepancy between the activity and needs expressed in words or behaviour of the company.
2. It can be a situation during a DS, in which the activity in question differs from the original

> Google DS format AND in which there is a fit or correspondence between the activity and needs as expressed in words or behaviour of the company.

For the sake of ease, both instances will be referred to as 'misfits', as in both situations Google DS format is not what meets the needs of the company.

To make the two misfit conceptions applicable in a structured data analysis, they were ostensively defined and qualitatively assessed while reading all text data meticulously through, as well as going through the photo documentation material of the cases.
Thus, misfit conception 1 is taken to apply to any instance in which, for example, a sprint team member expresses dissatisfaction with an activity or result of an activity, suggest that they do something other than the prescribed activity, questions why/how it must be done, or simply does something else or does not partake in the prescribed activity. Additionally, it would represent an instance of misfit conception 1 if the facilitator chose to skip or alter a traditional Google DS activity during the process. Low or declining mood curves point to instances, if the experience represented in the curve relates to the (Google) DS activities. An example is that a Partner from Company 5 in an exercise on sprint day 2 asks the facilitator: "Can we go a bit beyond the frame here? All of us have already done this. Maybe we should open a computer and start finding some elements."
Misfit conception 2 is taken to apply to any instance in which, for example, a sprint team member expresses distinct satisfaction with an activity or result of an activity that is not traditionally part of the Google DS format. High or rising mood curves point to instances, if the experience represented in the curve relates to the DS activities other than those prescribed in the Google DS format. An example is from Company 2 where new insights are gained from an exercise mapping the existing user journey of the company, which is not a formal part of the Google DS. The CEO says on sprint day 1: "It is beneficial to talk about all these things (…) and it's an eye- opener up here (on the existing user journey board) with a blank note on it. With all those (users/customers) we just say bye bye to. Actually, I have never thought about it, and it's embarrassing. (…) There are so many, and they have probably just moved on."

Going through all case data line by line (and photo by photo), each encountered instance of misfit (conception 1 and 2) was extracted to an analysis document (Excel table). The representative text quote or description of the instance was inserted along with data and respondent source, and for

each misfit instance, it was noted whether it was accompanied by a recommendation, an expression of need or other relevant comment (sometimes comments were also noted independently from misfit instances). Additionally, the instances were coded openly and inductively to find emerging misfit themes. See excerpt in Appendix 1.

Subsequently, all misfit themes were inductively clustered by axial coding, identifying patterns among the themes. This resulted in three main categories, each containing five sub-categories of misfits. These will be introduced in the following section.

4.2. Findings

Three main categories of misfits were found in the data (see Figure 4):

Sprint content relating to the exercises/activities in the DS, e.g., how to generate ideas. The content sub-categories are: Mapping, idea generation, prototyping, test, and delivery.

Sprint format relating to the frame of the DS within which the exercises/ activities take place, e.g., facilitation and transitions between exercises. The format sub-categories are: Balance, input, transitions, facilitation, and setting.

Sprint context relating to the surrounding circumstances that affect the DS and the yield of it, e.g. preparation and strategic considerations. The context sub-categories are: Preparation, follow-up, strategy, business model, and support.

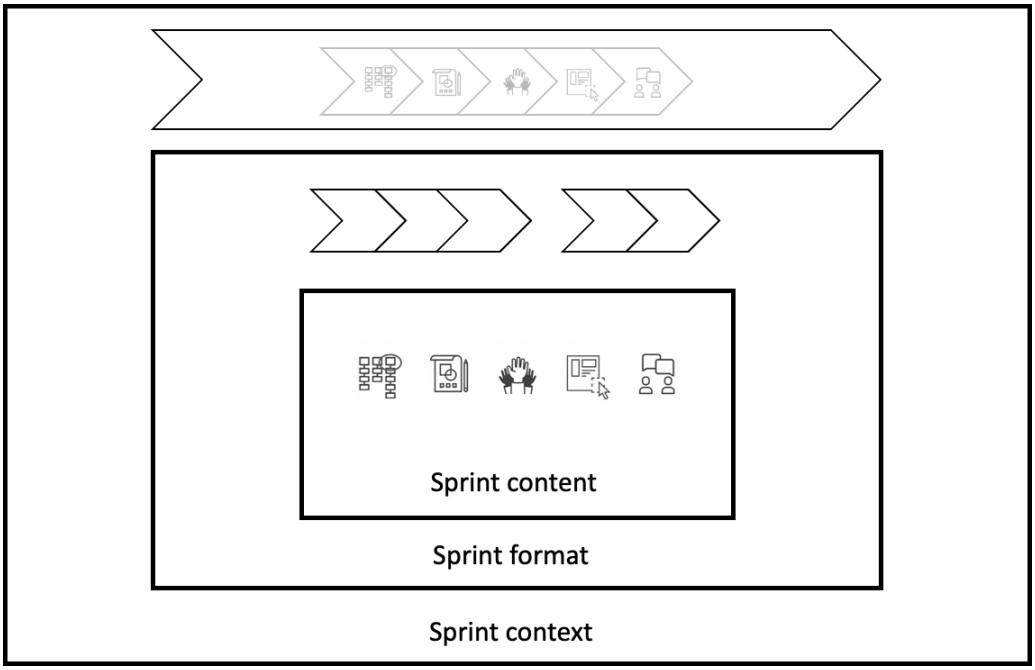


Figure 4: Three overall categories of misfit between DS format and company needs

In the following, the sub-categories to the three main misfit categories will be presented. The sub-categories are introduced with a short description of the original Google DS perspective on the misfit theme as represented in the sprint book (Knapp et al., 2016), and presented along with suggestions of how the misfits may be countered or addressed. The misfits presented under each sub-category represent both cross-case themes and unique case instances. The suggestions are derived by analysis of the data – both from the misfit conception 2, in which something else than the Google DS format works well for the sprint team, as well as from the notes of recommendations, expressions of need and other relevant comment.

4.2.1. Sprint content

Mapping

Google DS perspective

The Google DS prescribes that a simple map is made with the purpose of narrowing the task. The map should be designed as a simple user/ stakeholder journey/interaction through the service or with the product that the sprint participants imagine resulting from the DS. The Google DS does not specify what the start and end should be, but in the mapping examples shown in the book, the end of the map does not equal the long term goal defined in the DS.

Misfit

- The mapping exercise is hard, and it is unclear what to map (what constitutes start, steps, and end point).
- There is a need for a sprint goal (not just a long-term goal).
- There may be a need to map a network or hierarchy rather than a process.
- It is unclear what the level of abstraction or detail should be.
- The mapping exercise forces the process into early in 'solution mode', as it anticipates the solution for which ideas have not yet been generated.
- There may be a need to map the existing situation.
- Mapping needs depend on the openness of the task.

Suggestions

- Set sprint goals.
- The map can represent a process, structure, network, or hierarchy.
- Do not map a solution that has not yet been found.
- The map should uncover uncertainty/ gaps/ lack of knowledge/ problems.
- Mapping exercise should be adapted to the openness of the task.

Idea generation

Google DS perspective

The Google DS prescribes that idea generation is an individual process that takes place in silence. DS team members only look at the ideas of others when voting, where the best ideas are selected. The DS is aimed at efficiency, and plenary talk and discussion are minimized.

Misfit

- Combining and cross-pollinating ideas across team members in idea generation are found to be fruitful (e.g., passing around drawing in an 'idea relay', combining 'lightning demos', i.e. inspirational analogies for solutions, and combining solutions solution ideas).
- Plenary talk and 'ping-pong' are found to be sources of new ideas.
- Discussing and finding a name/title for the new concept can serve as u useful frame within which to generate and sharpen ideas, as the name signifies a (visionary/strategic) direction.

Suggestions

- Switch around drawings during the crazy eight exercise, to cross-pollinate ideas.
- Set aside time to talk about the developed ideas.
- Consider combining solutions after dot-voting instead of choosing just one.
- Brainstorm on the concept name.
- Make a 'parking lot' for unused ideas. This will generate a catalogue of ideas for later and ease the process of 'killing darlings', as they are not thrown away.

Prototyping

Google DS perspective

The Google DS prescribes that, based on the chosen solution idea, a storyboard is created as a visual plan for the prototype. The prototype is made by the sprint team. It is emphasized that the prototype should have as high fidelity as possible so that the test persons will react to it rather than give feedback on it.

Misfit

- The storyboard exercise is difficult, as it involves moving from an abstract concept to a concrete and specified solution.
- This abstraction leap can easily become too big, and entail too much focus on details that are not yet relevant, e.g., user interface design details such as the size of a button.
- Different prototype fidelity levels can be beneficial for and serve different needs depending on the nature of the task and how far progressed the process is.

Suggestions

- The facilitator must be strict in the storyboarding process, shifting focus from details to process.
- Visual 'building blocks' can be used to facilitate the move from abstract to concrete. Instead of drawing the storyboard from scratch, the team builds it with e.g., pre-defined wireframe elements that inherently specify the desired detail level. This can help avoid 'drawer's block' for participants and too much focus on details.
- Prototype fidelity levels must be adapted to fit the needs in the task. High fidelity prototypes provide very specific feedback. Low fidelity shifts attention to concept and creates interaction and co-creation with users.

Test

Google DS perspective

The Google DS prescribes that the test of the prototype is performed by the sprint team. Five user tests are performed with the same focus on one test person at a time. Reaction is sought, not feedback, discussion, and talk. Test subjects are recruited by a designated person on Tuesday.

Misfit

- Engagement, feedback, and suggestions from users can be valuable to sprinting companies, depending on their task and where they are in the process.
- Other test formats can provide valuable insights, e.g., focus groups that can provide valuable discussions.
- Companies can find it hard to recruit test persons and may fear that presenting something unfinished to their (potential) customers can cause a setback, and that imperfections in the prototype reflect negatively back on customers' perception of the company.

Suggestions

- Adapt the test setup to the needs in the task: Talk, feedback, co-creation can make sense in open, initial tasks.
- Recruit test persons in well advance of the DS. Communicate clearly and align expectations beforehand about the prototype and test and the purpose of it. Customers may be invited into the project as formal collaborators and co-creators.
- Being present at user testing is important. Teams that were not present during user testing have experienced other test foci than desired.
- It is valuable to have tests recorded on video to be able to recollect what was said and show user feedback/ reactions to colleagues who were not part of the DS.

Delivery

Google DS perspective

The Google DS prescribes that the sprint team finds patterns in test results after the test, has a short discussion and that on that basis, the Decider determines what to do next. The patterns paired with the original sprint question will show what the next step should be.

Misfit

- A clear action plan is needed after the DS to avoid the company feels 'left with a bunch of post-its' and unsure how to proceed.
- There is a need for a follow-up day after the test, where insights are summarized, next steps are laid out and coupled with strategic considerations.
- It can be valuable to make a summary document after each sprint day to ease the task of summarizing the accumulated insights after the DS.

Suggestions

- Deliver insights from sprint process and test on clear-cut document along with a plan for future action/steps.
- Set aside time to follow up after the test.
- If the company wishes to continue working on the prototype on their own after the DS, the prototype and delivery of it should have a format that is easily amenable to them.

4.2.2. Sprint format

Balance

Google DS perspective

The Google DS roughly prescribes, roughly put, that the first three days are spent exploring and choosing perspectives on the task and developing ideas. The last two days on prototyping and testing. Thus, there is an overall shift from an exploratory phase to an executive phase on/ after day 3.

Misfit

- The prescribed balance between exploration and execution may not meet the needs of the sprinting company and their task. Depending on the openness and progress of the task, some companies express the need for more time to explore the problem and develop a concept, while others need more time to execute, refining and building a high-fidelity prototype.
- Discussions revolve around whether the DS format should be followed strictly or if phases can be shortened or prolonged depending on the company's needs. And how

much an otherwise well-defined task should be challenged and reframed by the facilitator, if the company has done a lot of the work already.

- It is challenging to determine how (and if) to scope a sprint task to make it amenable in a DS.
- It may be useful or necessary to resort back to an explorative perspective in the end of the DS, as the insights from the test may result in new questions and uncertainty to be addressed.

Suggestions

- If a sprint task is scoped in size to fit the DS format, the DS may not address the questions or challenges that the level at which the company are faced with them.
- It may be beneficial to adjust the balance between exploration and execution in the DS depending on the task and its state of progress, initial or final.
- Company and facilitator should align expectations and agree in advance on how much time the facilitator may spend challenging the scope of a well-defined task.
- It may be gainful to consider a 'sandwich'-model, in which a sprint task that is more well-defined and with less need of initial exploration returns to an explorative state and considerations in the end, where new questions may have emerged. This may potentially be the starting point of a new DS.

Input

Google DS perspective

The Google DS prescribes that external data inputs during a DS consist of the exercise 'ask the experts' on day 1 and 'lightning demos' (seeking inspirational analogies from other companies and fields) on day 2. Users are not involved until the test. Finally, it is mentioned in the sprint book that it can be an advantage to interview customers prior to the DS. It is implied that the sprint team is typically recruited internally in the company.

Misfit

- In Sprint Digital, sometimes more than one company have sprinted with the facilitating agency simultaneously, however working on each their task. In these cases, the companies find that it provides new insights to discuss their tasks with the other

companies and get their feedback.

- Companies who have had external participants on their sprint team (e.g., one company had a design student on board, and other companies had other external members on their team) find it valuable to have an external party provide an outside-in perspective on the company and task, and ask the 'stupid' questions.
- Having an external designer on the team can add value and help the team visualize.
- Companies and facilitators find it valuable to bring customer or user inputs into the DS from the beginning of the DS, e.g., in the form of interviews or surveys.

Suggestions

- Have an external member on the team who asks 'stupid questions' and helps with idea generation and visualization.
- Include other external parties as needed.
- Include inputs from user or customers from the start.

Transitions

Google DS perspective

The Google DS prescribes a specific sequence of exercises, especially in the first days where the task is explored and defined. Not all steps in this process are substantiated. Dot voting takes place at two occasions during the DS, at the HMW-voting on day 1, and at idea selection on day 3.

Misfit

- Some sprint participants express that they miss cogency and logical coherence between the steps and exercises in the DS.
- Some wish to have more frequent voting session, i.e., convergent decision steps, while others

consider voting sessions superfluous if they perceive the team to already agree.

- Decision steps can be perceived as unclear, which can affect feeling of shared ownership to decisions.

Suggestions

- Documents summarizing insights for each sprint day can help make clear the

coherence between steps and how insights from one step/day are brought into the next.

- It may be advisable to use the exercise structure for sprint day 1 found in the 'Sprint 2.0'[6] format. In this format, sprint day 1 is initiated with inputs from experts so that these can inform subsequent steps, and the task is not mapped until after a goal and sprint questions have been defined.
- Make the decision steps clear - do not skip dot voting even though the team seemingly agrees, as this can be an assumption and can render decision steps unclear.

Facilitation

Google DS perspective

The Google DS prescribes that there is one facilitator on the team. The facilitator must avoid influencing decisions, but it is not described whether he or she should help with idea generation. The facilitator should look out for discussions and untimely idea generation and stop them.
It is suggested that a 'design expert' is part of the team – i.e., a representative from the department that designs the company's products.

Misfit

- It can be an advantage to have an extra (external) co-facilitator/designer on the sprint team to help support generation of content while the main facilitator focuses on keeping the structure.
- However, the number of co-facilitators can be too big, and they must not outnumber actual team members, as this can affect the team' feeling of ownership towards generated content.
- The number of facilitators can be too small. There must be a facilitator with the team throughout the entire DS, as the absence of a facilitator can cause the process to stagnate.
- The facilitation can be too passive in practice, if the team is stuck in a process and the facilitator does not help the team generate content or make decisions.

[6] Sprint 2.0 is an updated and abbreviated Sprint format developed by Google DS founder Jake Knapp and the sprint agency AJ&Smart. See e.g. https://www.invisionapp.com/inside-design/design-sprint-2/

Suggestions

- Bring an external co-facilitator/designer to the team.
- Make sure that there are more internal participants from the company externals.
- Make sure there is a facilitator with the team throughout the week.
- The facilitator must take control and support the team in their work if the process stops, even if it means generating ideas or helping decisions along.
- The facilitator must ensure inputs from all participants including more quiet team members and possibly externals.
- Keep the same facilitator throughout the week, as facilitator shifts are not helpful to the process.

Setting

Google DS perspective

The Google DS prescribes a five-day process without interruptions from Monday to Friday.
It is not mentioned whether the DS should take place inhouse at the company or at an external facility, but it is suggested that the sprint team can stay in the same room throughout the week, as the boards and walls in the room, with all its data on sticky notes, become like a 'shared brain' for the team. The five days must be blocked of other tasks as to focus on the DS.

Misfit

- For some teams it may be fruitful to place the DS with a weekend break after sprint day 3 in between two consecutive weeks. This is found to provide time for reflection, new energy and avoiding that the DS 'steals' an entire calendar week from other tasks.
- It is considered very beneficial to be in another location than the daily office, as it removes concrete distractions and helps the team shift focus from the daily tasks to the sprint task.

Suggestions

- If preferred, place the DS over a weekend. The break should be just before the prototyping day.
- Aim for a location out of the house (not at the company).

- Make sure that the employees time is freed up from daily tasks, so they do not pile up for afterwards - otherwise there is no energy and time to follow up on the sprint work once the DS is over.

4.2.3. Sprint context

Preparation

Google DS perspective

The Google DS does not prescribe a scoping process or meeting prior to the DS. It is mentioned at the end of the sprint book that it can be an advantage to interview customers first.
The sprint book is written so that it can be used with a facilitator internal to the company who must 'act as an outsider', and therefore knows the task and the company.

Misfit

- A scoping session is needed before the DS to frame the scope of the task for the DS.
- In the scoping session, expectations must be aligned between facilitator and company about:
    - How much/ for how long the task scope be challenged by the facilitator in the DS itself, e.g., by questioning whether the perceived challenge is the right one to solve?
    - What can the company expect to get out of a DS?
    - Who should the company test their solution with (target group)?
- The facilitator should be well-prepared, be familiar with the company's knowledge base and stage of development. If not, the facilitator can misjudge the kind of focus needed in the DS.

Suggestions

- Have a scoping meeting before the DS.
- Use the meeting to align expectations.
- The facilitator must have thorough knowledge of the company's own preparatory work in the project, so that he or she can challenge the task scope adequately.

Follow-up

Google DS perspective

The Google DS does not prescribe what should happen after the DS. It is mentioned that the DS is often the start of a longer process, and that the Decider must decide what should happen next. The Sprint book mentions the concept of a follow-up sprint a few times, but it does not elaborate on what it covers, in what cases it makes sense, or what the process towards it involves.

Misfit

- There is a need for devoted time at the end of the DS to make an action plan that defines the next steps.
- There is a need for a follow-up meeting that can help the company keep momentum in the continuing work after the DS, e.g., help with implementation of the solution.
- There is a request for a take-away DS model, i.e., a tool or model, to take home and use in the company for future processes.
- The company must set aside time and resources to keep up the work on the project after the DS so as not to lose momentum and suffer wasted efforts in the DS.

Suggestions

- Allow time to make an action plan for the next steps.
- Schedule a follow-up meeting between company and facilitator.
- Provide the company with a take-away DS model to take home and support the application of methods learned in DS to future projects.

Strategy

Google DS perspective

The Google DS prescribes that the DS begins with setting a Long-Term Goal, based on which the DS is initiated. In addition, the strategic context is not mentioned. It is mentioned that a DS can be used as part of the design of strategy. It is also mentioned that the DS can be used to test a direction for a longer process, which may be strategic. However, the book does not specify how to use the sprint result to set this direction.

Misfit

- It is vital to ensure a strategic anchoring of the sprint task to make the result relevant and viable.
- Only so much can be achieved in a five-day DS, so it must be defined in advance which

larger process the DS is part of. This helps contextualise the DS to apply the insights gained from it into further action.

- A digital DS benefits from a digital strategy. Digital systems inherently contain rules and restrictions that affect whether they can 'speak' with each other. Any digital development step must therefore be compatible with the future digitization initiatives that the company envisages. A digital strategy helps the company paint the future picture and get the first steps right.
- It can be advantageous to set aside time for strategic anchoring in the end of the DS, where new insight from the DS may make new strategic considerations relevant.

Suggestions

- Map out in advance: What larger process is the DS part of?
- Set aside time for strategic focus on day 5/ after the DS.
- Make sure that the concrete sprint solution is developed in a continuous dialogue with a strategic perspective, so that the two levels inform each other and evolve together.

Business model

Google DS perspective

The Google DS does not prescribe a separate focus on the business model. (Yet, the presumption of a business advantage of the sprint solution will likely be implicit in the motivation for the DS, and the validity of it may be tested in the sprint test.) The sprint book stipulates that a manager with the mandate to make viable business decisions must be involved as a 'Decider'. In a start-up, that manager is often the CEO. In a larger company, it may be a middle manager. The board is not mentioned.

Misfit

- There may be a need to focus more on and anchor the business model in DS, so that the DS and its output creates commercial value.
- The board and top management can advantageously be engaged in the DS to ensure that their perspectives are incorporated into a viable business model in the solution.

Suggestions

- Attune the DS focus with board and top management and engage them if possible.
- Possibly provide extra focus on business model in the DS. For example, use the three aspects of the business model *desirability* (value proposition), *feasibility* (key resources & processes) and *viability* (profit formula / value capture) as a starting point for:
    - Reflecting on the existing business model and priming of idea generation.
    - Evaluating ideas on decision day.
    - Evaluating the solution and determining next steps on the last sprint day.
- One test in one DS may not be enough: A concept should be tested for desirability, feasibility, and viability (business model), one at a time.

Support

Google DS perspective

The Google DS does not prescribe a solution to challenges related to economy and resources involved in doing a DS. However, the DS is based on the logic that companies can prevent wasting resources on the wrong project by investing one week in developing, building, and testing an idea before committing to it. The sprint book is intended for companies to use and run DSs themselves, which saves the cost of an external facilitator.

Misfit

- A fully paid, externally facilitated DS is very costly for an SME. Financial business promotion support helps SMEs afford DSs.
- The support should include a follow up session, which is vital for keeping momentum in the continuous work.
- Existing design experience motivates companies to spend the resources involved in doing a DS.
- There is a need for non-financial, ongoing design support and 'hand holding' to keep design thinking capacity alive in companies in between larger development projects, where design agencies are typically hired.

Suggestions

- Financial business promotion support can be important for building initial experience

and capacity for design (DSs and thinking) within the company.

- To maintain design thinking capacity and anchor it in the company, there is a need for an alternative design service to those typically bought from design agencies. This service should be a continuous design 'hand holding' consultancy, e.g., as a subscription or membership model.

5. Research part 2: Relation between 'Misfits' and task level

Research part 2 addresses research question 2: How do the conflicts and misfits relate to task levels as represented in the Task Ladder?

As mentioned earlier, Bordal (2021a) has found that conflicts or misfits between the DS and the tasks and needs of SMEs *can* relate to the openness of the task and has suggested the Task Ladder as a means to distinguish different levels of openness and associated characteristic that a task can assume. This section will analyse all identified misfits themes to determine which ones relate to and depend on the openness of the task, and account for the misfit variation across the Task Ladder levels. The purpose of this analytical step is to determine how the DS format can be adapted and differentiated across the task levels to target divergent needs more specifically.

The analysis presented here, will not treat each task ladder level individually, but rather refer to the task ladder as a scale, and account for how misfits vary as a function of this scale.

5.1 Method

To find misfit instances that relate to and depend on task level, the analysis document from Research part 1 was used as a point of reference. All misfit instances captured on the document, was assessed for accompanying information that could point to a task level relation, revisiting the original data source, when necessary. This analysis was conducted by a contextual qualitative assessment, supported by hedge words related to the theoretical definition of task scale (Bordal, 2021a, s. 3–5), involving concepts such ad progress and (un)certainty. Thus, a task level relation could be indicated by word such as *certain* /*uncertain*, *question*, *know*/ *don't know*, *sure*/ *unsure,* mentions of how *far* they have come in the process.

An example of a misfit with a task level relation is found in the notes from Company 8 on sprint day 1 after the mapping exercise. Here, the Decider tells, that she felt stuck during the exercise because "We weren't sure what we wanted". This meant that she felt "forced into solution mode". This quote shows that for Company 8 the challenge or misfit with the mapping exercise, having to map the not yet existing solution, relates to the fact their task is still very open, and they have not yet come to a point in their overall process, where they know what they want.

Another example relates to the balance between exploration and execution. In an interview after the DS, CEO and Decider from Company 6 says "The sprint was very detail oriented and a bit heavy in the process. [The Facilitator] wanted us to go slavishly through the process, but it didn't make sense to us, because we just wanted to get on with the design of the configurator. (…) If you start with e.g. a website, then you have a more open task where it makes more sense to use the entire process. Our sprint task was more specific". This quote shows that for Company 6 the misfit with the DS balance is related to the task level, in this case a more closed, well-defined task. The Company 6 sprint team just want to get on with creating the solution that they already know they want to build rather than spending their time on the more explorative process steps in the beginning of the DS.

For each instance in which a misfit theme was found to relate to task level, all other instances of the same theme were assessed to determine whether and how they related to task level. Based on this, the findings presented below are based on the accumulated findings for each misfit theme that is associated with and varies depending on task scale level.

5.2 Findings

Four misfit themes were found to relate to and vary dependent on task scale level: Mapping, Balance, Prototyping and Testing. In the following, the way in which they vary will be explicated.

Mapping

Task scale level	Misfit
Mapping of open, low-level tasks	Is difficult/ unfit, gets too abstract, entails early solution focus, may need to map existing processes instead.
Mapping of closed, high-level tasks	May need to map existing processes instead.

Table 1: Differentiated mapping misfits

The mapping exercise on day 1 is portrayed as a simple user journey through the service or with the product that the company envisages to be a result of the DS. The sprint book (Knapp et al., 2016) does not clearly specify what the start, end and steps in the map should consist of, and the exercise is perceived as difficult to understand and perform by both sprinting companies and facilitators (Table 1). E.g., one Facilitator (case 1) says that the map is difficult to communicate and that “companies have a hard time understanding what it is [they] have to map. What kind of process is it? Internal or external?”.

The purpose of the map is to define the right challenge for the DS (Knapp et al., 2016, p. 60) and avoid immediately thinking about solutions (p. 54). But at the same time, the exercise suggests that the map outlines a future situation in which the solution to-be and output of the DS is central. This is, noticeable, prior to the idea-generating activities on day 2 of the DS. It can thus be argued that the map actually entails, not prevents, an early solution focus in the DS, which conditions the subsequent activities and choices. E.g., this is experienced by the sprint team from Company 8, who say that the mapping exercise was difficult because they did not yet know what they wanted, but the exercise made them feel "forced into solution mode". The point is supported by several facilitators. For example, a Facilitator (case 7) says that the problem with the map could be "a frustration about facing some challenges that we did not know how to solve at the time". He explains that by making the map, you are making "some assumptions at this point that are not necessarily the right ones to bring along all the way [in the DS process] ". The same trend is seen by Raubenolt (2016, s. 99), who writes that it can be a challenge for a team not to prescribe solutions in the mapping exercise. The facilitator in Case 7 can be said to have taken the consequence of this problem in the DS by omitting the mapping altogether, as it is such an "open and innovative process" that the case company works with.

Since the purpose of the mapping exercise is to find the right 'problem' to address in the DS, but the map is solution focused, this would naturally imply that the exercise is less ambiguous in a situation where the problem and questions to be answered reside in an existing solution idea. This may explain why difficulties with the mapping exercise are primarily found in more open tasks.

If a company works on a more closed, high-level task and has already defined a solution, a mapping of this solution and the imagined interaction with might reveal important problems that the DS can

advantageously zoom in on. But if the company has an open, low-level task and the solution does not exist yet, the attempt to map it will probably not shed light on the significant problems and uncertainties that they want to address. If they try to do it anyway, it can result in a premature solution focus, as we saw above, that sets a potentially limiting framework for the subsequent idea generation.

Instead, it may make sense to map and thus gain more insight into the existing processes, the market context, or any other situation or process in which the reason and problem exists that motivates the company to do the DS, and which the company needs to understand and find solutions for in the DS.

For example, a team member from Company 1 says that she misses having a "common picture of what it is we do today, where is it hard, and where is it working, and where is it not working?" She suggests that a solution could be: ”that we had drawn that diagram [map] about the area we wanted to work on, how does it work today? And spotted those areas where we say: “Here is really something to attend to and do differently” and then [subsequently] do the brainstorm [mapping] […] it could have given me a clearer picture of how we arrived at it.”

Table 2 shows suggestions of how to differentiate the DS format with regard to mapping.

Task scale level	**Suggestion**
Mapping of open, low-level tasks	Map problems that must be addressed. These may reside in the market or context from which the company wants to differentiate itself
Mapping of mid-level tasks	Map problems that must be addressed. The may reside in the existing processes.
Mapping of closed, high-level tasks	Map problems that must be addressed. These may reside in the defined solution idea and potential assumptions it builds on

Table 2: Differentiated mapping suggestions

Balance

Task scale level	**Misfit**
Balance of open, low-level tasks	There is too little time to explore the problem, the task is expansive, and it is hard to frame and define it within the given time frame
Balance of closed, high-level tasks	There is too much time to explore the problem, which is perceived redundant when the solution concept has already been defined. A quicker transition to and more time for prototyping is needed. The test may reveal new questions and openness in the end.

Table 3: Differentiated balance misfits

The balance between exploration and execution in the DS results in misfits for both, low-level tasks and closed, high-level task (Table 3).

An example of a balance misfit in a more 'closed' task can be found in Company 2. Here, the CEO and Decider says after the DS: “Day one was a waste of time, because I knew what it was we wanted to make. [...] day one was frustrating, because we had spent like a year on becoming clear on ‘this is what we want to do’. So now having to spend a day discussing it [...] I felt that it was ineffective”. The quote shows that the explorative first part of the DS can feel redundant if the company has a very defined task.

An example of a balance misfit in a more open, low-level task is found in Company 3. Here a Partner and Decider says, after the first sprint day: "We get it [the task] opened up and shown how complex it becomes, so it also makes it difficult to say that it is the one or one [direction] I want to choose as a priority, shoot, it is hard, because this and that they are also [important], how ...? That’s where I could have used some more time to be able to work with some of all the things we had identified.” This quote shows that the explorative part of the DS can feel too short for more open tasks.

It is especially on the first exploratory days of the DS that discrepancies between the DS format and the task can be experienced, because this is where the sprint exercises open the task divergently and time is spent on idea generation. It is in this phase that time can feel too scarce if the task is initial and open, and the company may be afraid to overlook perspectives and opportunities on the go.
Likewise, it is in this phase, time can feel superfluous if one has already spent a long time on the task prior and already knows what one wants to do. In the DS, the latter situation can also result in an experience of too short a time for the executing part where the prototype is to be built. The CEO of Company 2 says, for example, that the first two days could well have been one, and that he could instead "have spent more time down to the last detail on the solution."

As stated above, both a too open and a too closed task can 'clash' with the DS format, and hence a mid-level, e.g., at level 1 or 2 on the Task Ladder, will in many cases be most compatible with the

Google DS format. Here, there will be enough openness for the exploration phase to be meaningful, and at the same time enough 'closeness' and direction for the company to experience that good and informed decisions can be made within the time frame.

To avoid balance misfits, there are more approaches.
One place to act is in a scoping meeting prior to the DS, where the size and focus of the task is discussed and defined in interaction between company and facilitator. A Facilitator describes the importance of scoping as follows: "If you come up with 10 questions and they all go in different directions, then you are not prepared for a sprint. It is too open [...]the screening of companies and the scoping is important [to] cut down the challenge". If sprint tasks can be scoped in a way that they hit the middle of the scale, it can mean fewer perceived discrepancies between DS format and task. However, it is important to be aware that a narrow scoping of an otherwise open and complex task can mean that the complexity of the task is simply 'cut away' in the DS, and that the resulting thus not necessarily addresses the root of a problem, as this may hide in the complexity in the form of a paradox (Dorst, 2015).
Another important factor is aligning expectation about how much a sprint task should be opened and challenged in the first part of the DS and anticipate the emotions it may elicit.
Firstly, as described, it can create frustration for a company with a 'closed' task, if they are forced to spend many hours questioning their solution. By matching expectations, the facilitator can prepare the company for the fact that it is common and often constructive to experience frustration in a process where new solutions are created, as, according to Facilitator for Company 5, the frustration is linked to challenging assumptions, and creating radically new ideas. Secondly, the facilitator and the company can agree prior to the DS on how long time should be spent in this potentially frustrating, exploratory phase, and what it contributes. There is a difference between experiencing a constructive frustration from being challenged, and then experiencing frustration from feeling that the DS format misses the target of the task needs and lingers too long on challenging validated work and progress. Aligning expectations can be a measure to avoid the two being confused.
Adapting the balance in the DS format is another way of addressing potential misfit and has the advantage that the format is adapted to the company's needs rather than determining the scope of the task the company can solve within it. This makes the DS useful in more and different situations. Adaptation of the DS format can for example become relevant through aligning expectation, if the

company and facilitator agree to only spend one day exploring.

Table 4 suggests how the DS can be adapted to counter the balance related misfits.

Task scale level	Suggestion
Balance of open, low-level tasks	Spend more time in the explorative phase. Spend less time in the executive phase making the prototype, and accept a rough, conceptual prototype
Balance of closed, high-level tasks	Spend less time in the explorative phase. Resort earlier to the executive phase and spend more time building a high-fidelity prototype. Possibly, revisit new, open process questions that may arise after testing.

Table 4: Differentiated balance suggestions

Prototyping and testing

Task scale level	Misfit
Prototyping and testing in open, low-level tasks	Need to aim for low fidelity prototypes, beneficial to interact/ co-create with users and get feedback
Prototyping and testing in closed, high-level tasks	–

Table 5: Differentiated prototyping and testing misfits

Closely related to balance misfits are the misfits that relate to prototyping and testing - and the purpose these activities serve. Prototyping and testing are treated under one heading, as they are inextricably linked.

On day 4 of the DS, the generated solution idea must be manifested in a prototype, which is tested with users on day 5. The DS format advocates building a prototype that is perceived realistic in interaction (high fidelity / resolution), so that it imitates a real, finished solution in the test for the purpose of eliciting authentic user reactions (Knapp et al., 2016, pp. 169–170). If the prototype is a diffuse paper model, for example consisting of drawings or a simple wireframe (low fidelity / resolution) it will break the illusion (p. 169). This distinction between user reactions and feedback is important according to the sprint book, which - without further elaboration - points out that reactions are valuable, while feedback, where the user tries to be helpful and make suggestions, is not worth much (p. 170).

However, several case companies work with, and highlight the value of, simpler prototypes. For example, Company 3's prototype consists of a series of hand drawings. The sprint team say that they made the prototype simple on purpose, so that "the test persons do not have to relate to exactly what it should look like". By drawing by hand and “keeping it rough”, the team explains, the prototype exudes ‘mock-up’, which is an advantage because they do not want to draw test subjects' attention to details such as fonts, but instead to function and content.

Likewise, Company 4 is aware of what the prototype exudes. The team has made a cardboard iPad that shows their solution. The CEO and decider says that "We could also have made it on a real iPad, but then it would seem as if we had already developed it. [...] When it is made of cardboard, it will seem more as if it is something they [the users] can help to decide the appearance of. Then it's a kind of mini-their-project too.” Thereby, the low fidelity prototype invites users in to co-create on the project.

Figure 5 depicts an analysis made after the first seven cases in Sprint Digital, the orange dots each representing a case. The figure shows that task level and prototype fidelity level increase approximately proportionally (see method in Appendix 2), and thus that the two are apparently linked.

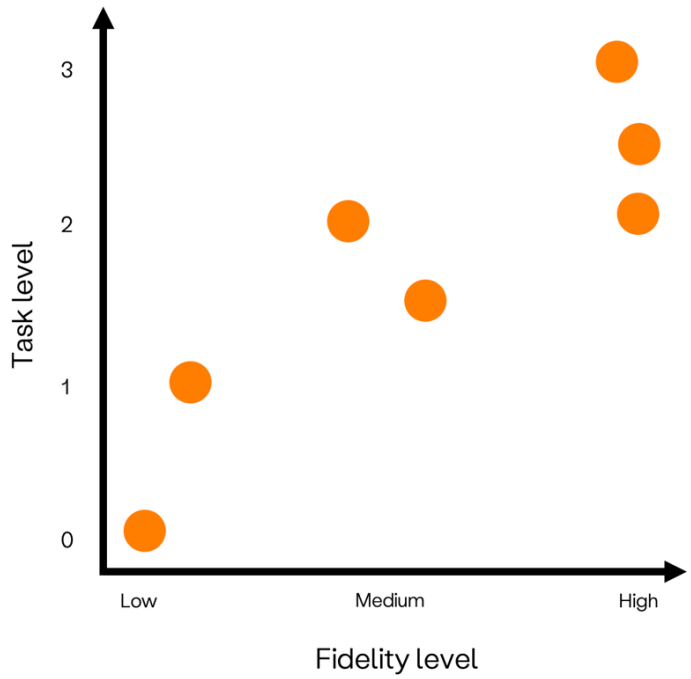


Figure 5: Task level coincides with prototype fidelity level

The Task Ladder suggest that there is a difference between how far the company can get towards a finished solution in one DS, depending on the level of progress at which they start out. Thus, it may make sense to operate with a corresponding differentiation of the character and fidelity level of the prototype.

If the company has just initiated a project, the five sprint days will probably not take them all the way to a detailed, finished solution, and hence it does not make sense to express and evaluate the sprint result by its surface and visual finish in a high-fidelity prototype. Rather, the sprint outcome will likely assume the nature of a vision, a strategic approach, or a rough conceptual idea. Hence, that is what needs to be evaluated. When the task is open, and uncertainty high it can make sense for companies to let the customers help shape it and give inputs.

If the company sprints with a more closed task in the end of a longer project, on the other hand, they might realistically reach a refined solution that can be expressed and evaluated in a high-fidelity prototype.

The recommendations regarding prototype and testing in the Google DS format are in line with the way prototyping is typically used in industrial product development, where the purpose is to complete, manufacture and validate products (Liedtka, 2015; Micheli et al., 2018a). In the design thinking literature, however, a different approach to prototyping is found, where a low level of detail is typically at the centre (See e.g. Bauer & Eagen, 2008; Carlgren et al., 2016; Liedtka, 2017), as it promotes feedback from and dialogue with users (Glen et al., 2014; Liedtka, 2015, 2017; Tschimmel, 2012). For example, Moggridge (2007) writes that "Rapid generation of low-fidelity prototypes deepens the dialogue with potential users, thereby speeding up the learning cycles and further clarifying the nature of the problem to be solved". In this way, prototyping creates an experimental 'playground' (Liedtka, 2015), where one can co-create ideas and solutions with users.

On the basis of this it makes sense, as the Google DS suggests, to aim for realistic prototypes in more closed, high-level tasks, where the process is typically more advanced and the solution ideas closer to 'finished'. Conversely, more open, low-level tasks can benefit from the user interaction and co-creative idea development that more simple, low-fidelity prototypes can promote. In this way, prototyping and testing can help to support the different process needs and foci that can be in different tasks across the different task scale levels. See Table 6.

Task scale level	**Suggestion**
Prototyping and testing in open, low-level tasks	The sprint outcome is of abstract, conceptual nature. Development of problem understanding. Aim for low-fidelity prototype. Use prototyping as a co- creative tool with users and allow feedback.
Prototyping and testing in mid-level tasks	The sprint outcome is of medium abstraction level. Development of concept and features. Aim for medium fidelity level.
Prototyping and testing in closed, high-level tasks	The sprint outcome is a concrete, refined solution. Development of functionality. Aim for high fidelity prototype. Use prototype to build, complete and validate solution.

Table 6: Differentiated prototyping and testing suggestions.

6. Research part 3: The Adaptive Sprint Model

Research part 3 addresses research question 3: On basis of investigating the questions above, what kind of adaptations and differentiations to the DS format could be proposed to maintain DS qualities while meeting different needs of diverse tasks?

In the research part 1 and 2, suggestions have been introduced as to how the DS might be adapted based on the misfits identified in the analyses. Building on these suggestions, this section features a visual proposal of ways to apply the suggestions in practice and adapt and differentiate the DS format to better meet the diverse tasks and needs of SME. In sum, the proposal is conceptualized as the Adaptive Sprint Model.

The Adaptive Sprint Model

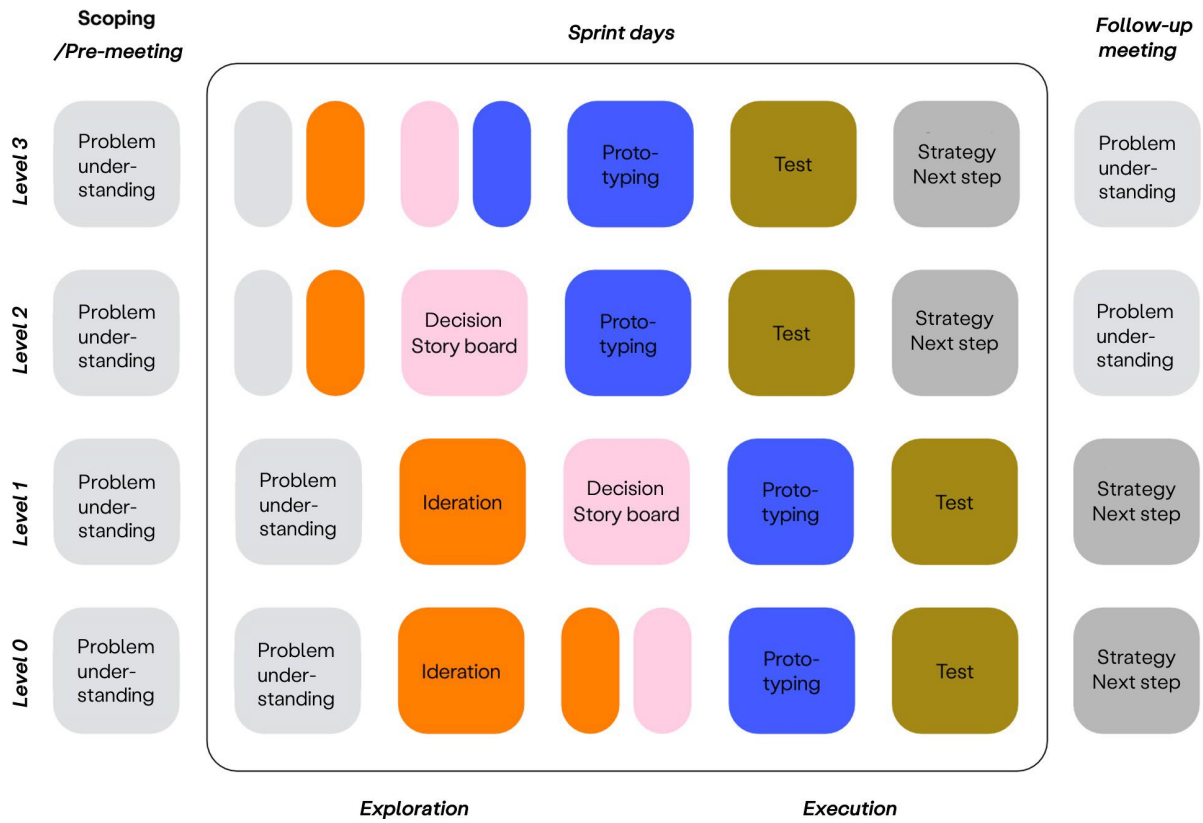


Figure 6: Adaptive Sprint Model, 1 (Based on model from Bordal, 2021b)

Figure 6 shows some of the differentiation proposed in the Adaptive Sprint Model. The figure summons several adaptations based on misfit themes and suggestions from research part 1 and 2:

Balance

It is proposed that the balance between exploration and execution in the DS is displaced across task

levels, so a high-level task has more time for the executive phase and a low-level task has more time for the explorative phase. A DS that quickly transitions to execution may open up to new explorative reflections in the end if the test revealss new questions and problems to be explored.

Preparation

It is proposed that the DS is preceded by a scoping meeting, used to define the task and align expectations about the DS: What can the company expect to achieve and how much and long will their task definition be challenged by the facilitator?

Follow-up

It is proposed that a follow-up meeting between company and facilitator is scheduled to plan and keep momentum in the process after the DS.

Strategy

It is proposed that time is made for strategic reflections on day 5 / after the DS: How does the DS output align with the overall strategic direction, and what are the next steps to take. Next steps should be planned and documented in an action plan.

Delivery

The extra day for strategy/ next step will support constructive delivery of sprint and test results and convert these to an actionable plan.

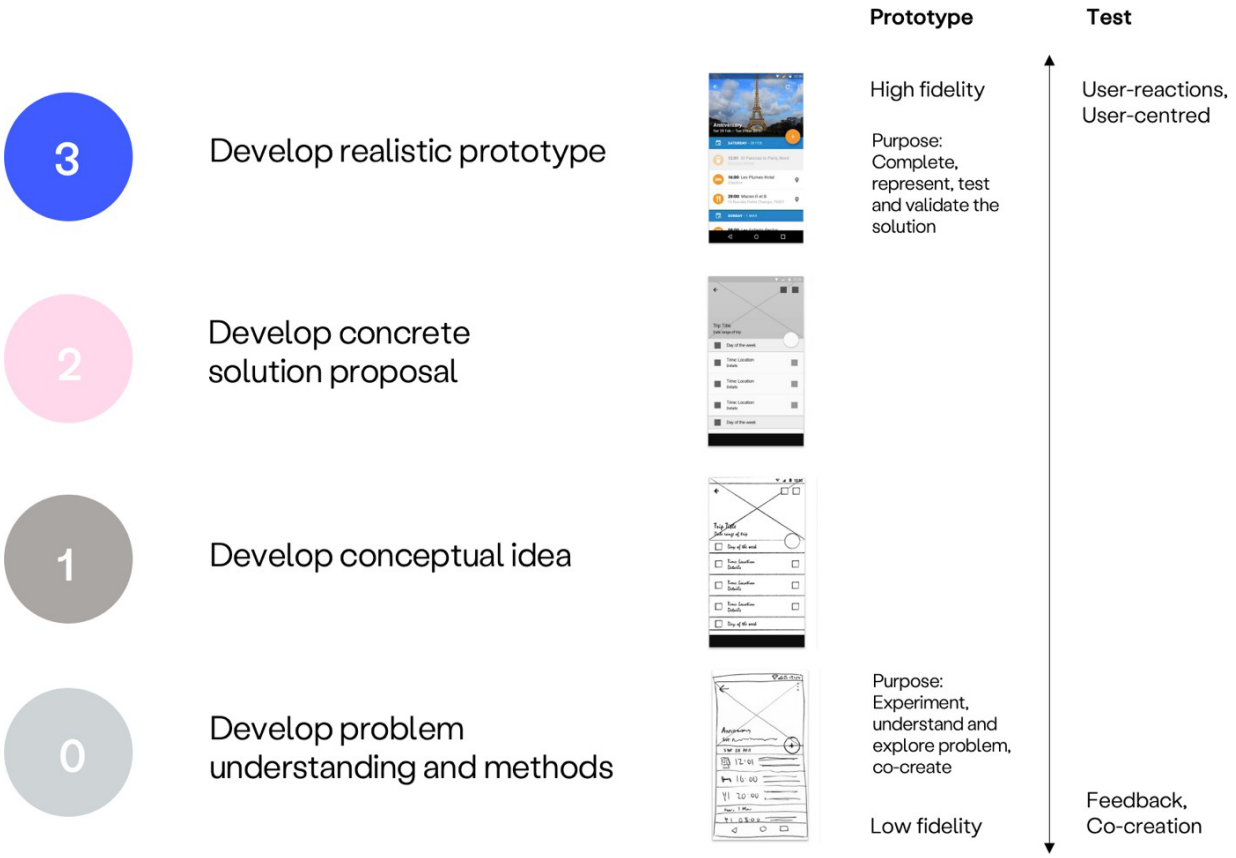


Figure 7: Adaptive Sprint Model, 2

Figure 7 addresses the prototyping and testing misfits and suggestions, presented in research part 2.

Prototyping and testing

It is proposed that prototyping and testing is differentiated across task levels:

A low-level task should aim for a low-fidelity prototype with the purpose of exploring and understanding the problem and experimenting and co-creating with users. The test should not aim to elicit reactions but invite active feedback from users.

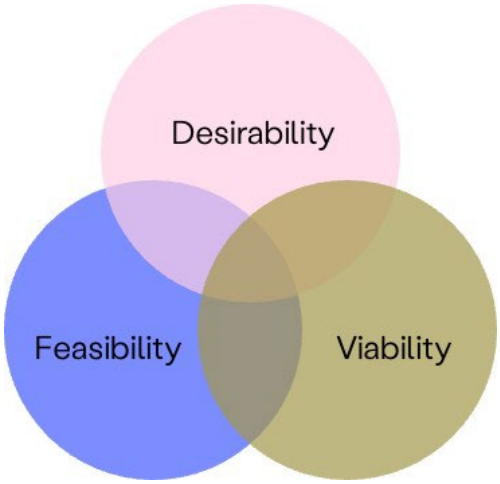
A high-level task should aim for a high-fidelity prototype with the purpose of building, completing, and validating the sprint solution/ design proposal. The test could aim for eliciting user reactions.

Figure 8 below addresses misfits and suggestions related to the business model and the need to give it more focus in the DS. In the model, the concept of 'business model' is represented by the criteria of desirability (what people want), feasibility (what is technically and organizationally feasible),and viability (what is likely to become a sustainable business model) (Brown, 2009; Dennehy et al., 2019). Balancing these is key desirability, feasibility, and viability in view of systems is key to the success and implementation of new products/ services, and the business models around them (Baldassarre

et al., 2020; Brown, 2009).

Business model

It is proposed that a business model focus may be implemented in the DS. This can be done at three different places in the DS: At the beginning to prime idea generation, at decision day to validate evaluation criteria, and at the end to evaluate the solution and identify uncertainties or questions for further exploration.



When	Day 1	Decision day	Strategy day
How	• The company answers questions for themselves • Supplemented through the 'ask the experts' exercise	• Heatmap voting: Evaluation of ideas is validated by assessing business model aspects and criteria (instead of voting for 'the best' idea) • Each business model aspect gets its own dot colour	• Consider and describe knowledge and uncertainties related to each business model aspect
Desirability	• Who are our customers? • What are their pains and needs?	• Relieved pains and met needs for our customers	• Describe value proposition • Describe related uncertainties
Feasibility	• What are our strengths and resources	• Builds on our strengths and resources	• Describe needed resources and processes • Describe related uncertainties
Viability	• What are the future tendencies and needs in the market? • What should we make money on in the future?	• (Economically) sustainable and future proof	• Describe profit model • Describe related uncertainties
Purpose	Priming idea generation with reflections that support a sustainable business model	Qualify and differentiate the evaluation of generated ideas based on business model aspects	The business model for the solution is mapped and uncertainties defined for further exploration.

Figure 8: Adaptive Sprint Model, 3

Discussion

The purpose of this paper has been to identify ways to maintain the benefits of the DS as a simple and effective way of working with developing new ideas and solutions, while accommodating a more diverse set of needs in different types of design problems experienced in the SME context.

The differentiations and adaptation to the Google DS format proposed in the Adaptive Sprint Model thus rest on the implicit hypothesis that the DS is already valuable and working, and that only distinct misfits need to be adapted. This assumption can be contested, as it could be argued that an initial and open task should not be squeezed into a DS in the first place, but instead be targeted with a longer innovation process with more focus on initial research and problem investigation. However, if a DS is understood as one iteration out of a possible many, and it is acknowledged, as argued in the Task Ladder, that one DS cannot convey a task all the way from an open initial stage to a final solution, then a DS is just another word for working iteratively and solution focused trial and error, which are inherent traits in design and design thinking (See e.g. Lawson, 1980; Micheli et al., 2018b).

Bordal (2021b) has found that the motivation for SMEs to embark on and invest in design thinking activities paradoxically is created from experience with exactly those kind of activities. Taking this into perspective, a DS adapted to a more open task can also be seen as way for design inexperienced companies to obtain initial design experience without investing in and committing to a longer innovation process. This experience and the insights gained through it may subsequently lead to the motivation and willingness to embark on a longer innovation process.

Finally, the Adaptive Sprint Model should not be considered a rigid recipe but rather a source of inspiration for how to hack DSs for unique tasks and needs. Therefore, the Adaptive Sprint Model can be used both partly or in its entirety.

7. Conclusion

This paper has analyzed and identified misfits or conflicts between DSs and the diverse needs and tasks of SMEs, and suggested ways in which these misfits can be countered in order to adapt the DS to the specific task needs, while maintaining the benefits of the DS. Three main categories of misfits have been found relating to the sprint content, format, and context, each with five subcategories of misfit themes. The misfits have been analyzed by use of the Task Ladder framework (Bordal, 2021a), which differentiates levels of task openness, in order to understand what and how misfits relate to the progress and openness in the sprint task. Four misfit themes were found to be related to and depend on task level, namely Mapping, Balance, Prototyping and Test.

Based on the findings, an adapted and differentiated DS model, the Adaptive Sprint Model, has been proposed. The model suggests ways to modify the DS to target various tasks and needs. Thereby, the Adaptive Sprint Model serves to expands the range of application for DSs. The Adaptive Sprint Model is meant as an inspiration to e.g., companies, facilitators or others working with DSs, and can be used partly or in its entirety to target sprint efforts to the needs in the task. The Adaptive Sprint Model does not suggest that a DS can replace a longer design or innovation process, but a DS can be seen as an iteration in it and can be a means to gain initial design experience that can motivate further design activities.

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Appendix 1

Excerpt from analysis document, misfits.

Data source	Misfit 1 (misfit with traditional format)	Misfit 2 (fit with adapted format)	Need/ recommendation/ comment	Theme/ interpretation
Interview with Decider from Company 3 after sprint day 2	This thing we are dealing is so damned complex (…) This is where it shows that it is extremely short time we have to look into our (task)… because it is so… At the same time, that is also where it shows that we are very different from each other.			The task is complex There is too little time to get into the task *The task is too complex for the format* *Task complexity* *Format limits*
Interview with Decider from Company 3 after sprint day 2		Respondent: Then we had this idea relay race (where drawings were passed around among sprint team members) which I thought was really good (…) like a tool, where we passed it around like that Interviewer: What did it give you to pass it around like that? Respondent: It showed our differences, but also gave some inspiration, that suddenly you get a palette, something you have to work onwards with, and like "that's not how I had thought about". There were some concrete places where it shot me in new directions.		Idea relay race was good Showed differences Gave inspiration Discovered other way of thinking Gave new directions *Co-visualisation, combining ideas, pushes people beyond their regular way of thinking -> co-creative* *Creativity* *Visualisation*
Off boarding meeting with sprint team and facilitator after sprint, meeting/ interview		Respondent A: It was great to have (the external design student) on the team (Everyone else agrees) Respondent A: I would give a lot to have her drawing skills. Honestly, I have to say, that really created a lot of good things. Interviewer: What did it create in your opinion? Respondent A: I just think (…) with a single visualization, she could say more than a thousand words. It was so cool and easy.	(After talking about how it was having an external design student participating on their sprint team) Respondent A: I think it's important for future sprints to get an external person to take part even if its maybe difficult, and I don't know who it should be. In that way it doesn't get so internal, and there is another vibe on the team. It is legal to say "what is it you are doing?" Facilitator: Having someone from the outside forces you to look at things a bit from the outside in Respondent B: Yes, and she was there all the time	Good to have a design student on the team for the entire sprint Good with visualizations A picture says more than 1000 words Outsider => less internal, other questions *The team didn't have a facilitator on their side the entire time => need for other person* *An outsider is allowed to ask 'stupid' questions -> see things in new ways, discover misalignment/ differences* *Visualization eases communication* *Outside in perspective* *Visualization*

				Facilitation

Appendix 2

Figure 5, analysis method

The analysis represented in Figure 5 was made by first analysing all cases by means of the Task Ladder, and assigning each case to the best fitting task level. Afterwards, pictures of the prototypes of all cases were shown to three design professionals, who were asked to determine the prototype fidelity level of each case as either low, medium, or high. Based on their answers, each case was assigned the prototype