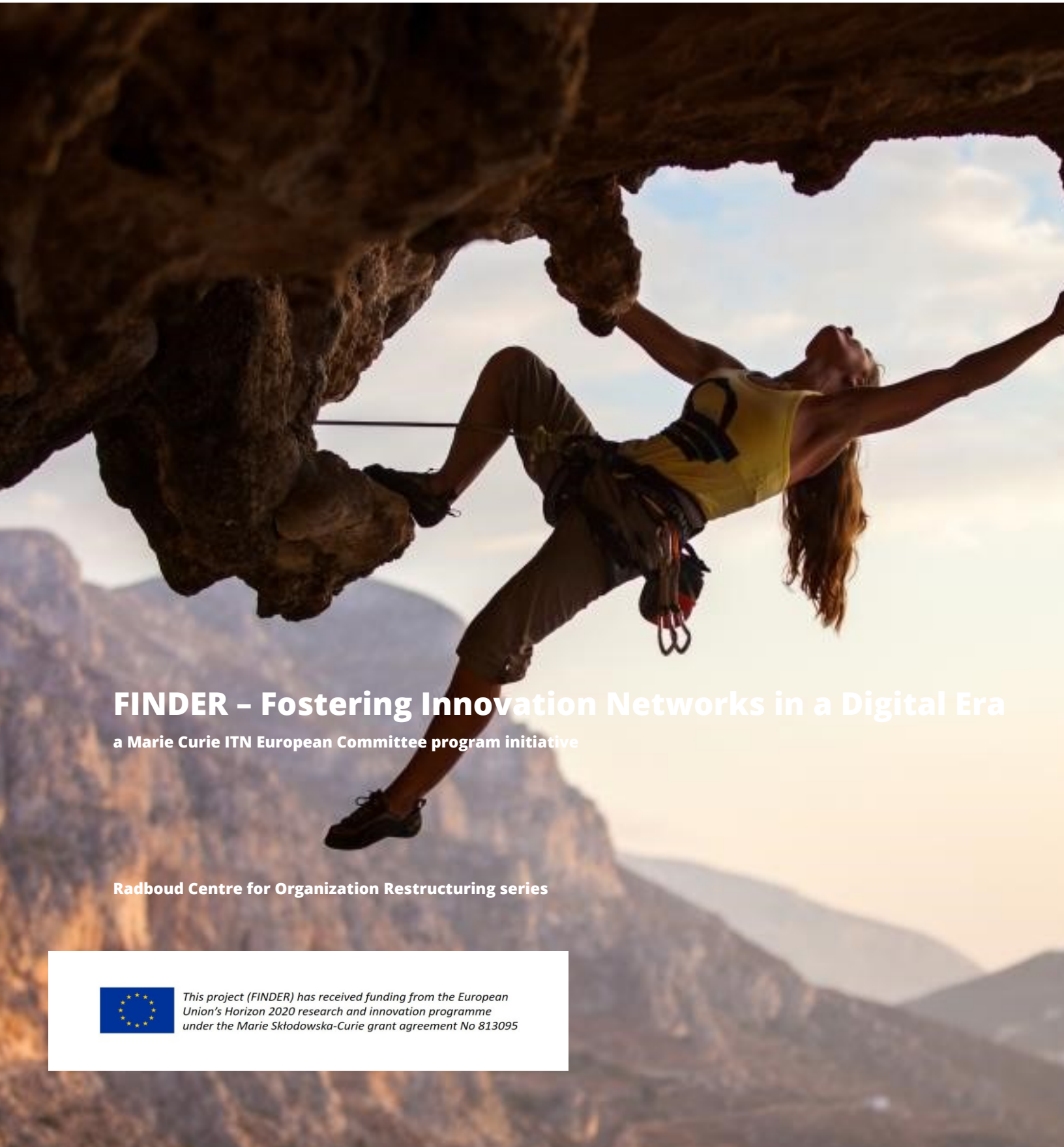

FINDER – Fostering Innovation Networks in a Digital Era

a Marie Curie ITN European Committee program initiative

Radboud Centre for Organization Restructuring series

This project (FINDER) has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 813095

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"Success is not final, failure is not fatal: it is the courage to continue that counts."

-

Winston Churchill

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Fostering Innovation Networks in a Digital Era

FINDER, a competitive Marie Curie Research and Training Program funded by the European Committee stands for Fostering Innovation Networks in a Digital Era. The FINDER program sets out to Foster Innovation Networks in a Digital Era. Appointed Marie Curie FINDER PhD Fellows investigate the innovative collaborative arrangement among organizations as they inclusively explore digital technology for new product or market development.

This eBook attests to the various angles the FINDER project has explored over the past years in close collaboration between Radboud University, Atos and the business partners including TechQuartier and Voleo. Akin in extreme sports, where participants push themselves to their physical limits by performing dangerous activities, in academic research and training that takes place on the crossroads of business and science the team sought after new horizons and took risks by exploring new and uncharted areas of knowledge. Where inn sports, athletes work together to improve their team's overall performance, similarly, the FINDER crew collaborated with many others to ramp up their learning, to collect and analyze both qualitative and quantitative inputs, reporting on their data amongst other by means of this eBook.

Atos
MARIE CURIE ACTIONS
Radboud Universiteit Nijmegen

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Foreword – an academic perspective

The FINDER program is rooted in the wish, and necessity, to enable students to study and benefit from both academic and industrial processes and knowledge. These two worlds are not exclusive after all, but very much intertwined.

Presenting my ideas a number of years ago to Remco Neuteboom (then Senior Vice President, Chief Digital Officer, Global Financial Services at Atos) on the ambition to jointly trail on research and practice, this ultimately led to a deep collaboration between Atos and Radboud University. This collaboration set out to investigate the innovative collaborative arrangement among organizations as they inclusively explore digital technology for new product or market development. Minted as the FINDER Project, a competitive Marie Curie Research and Training Program funded by the European Committee, a new generation of early career scholars set out to explore on the crossroads of theory and practice. These activities were driven by the mantra to Foster Innovation Networks in a Digital Era. In the following years each of the appointed Marie Curie FINDER PhD Fellows investigated the innovative collaborative arrangement among organizations as they inclusively explore digital technology for new product or market development.

As outcome of this endeavor that could not have come off-ground without the tremendous support by the entire FINDER community (*see Appendix 1 for the full listing*), mountains were moved and various practical and academical hurdles were taken. But not without effect; In front of you lies an important outcome of this collective endeavor: the FINDER eBook, a final report reflecting on the results of the different research projects and network activities carried out during the FINDER project's lifespan, and those which will continue to be carried out in the time to come.

Each aspect of the FINDER eBook has been co-created by the FINDER cohort of Early Stage Researchers based at the Institute for Management Research Radboud University (The Netherlands) in collaboration with their academic and industrial supervisors. Breaking new grounds on research on collaborative Fintech at large, this reading provides guidelines and best practices that emerged these past years, all centered around the ambition to **Foster Innovation Networks in a Digital Era.** In terms of its conceptual and empirical roots it combines scholarly stringency with practical relevance.

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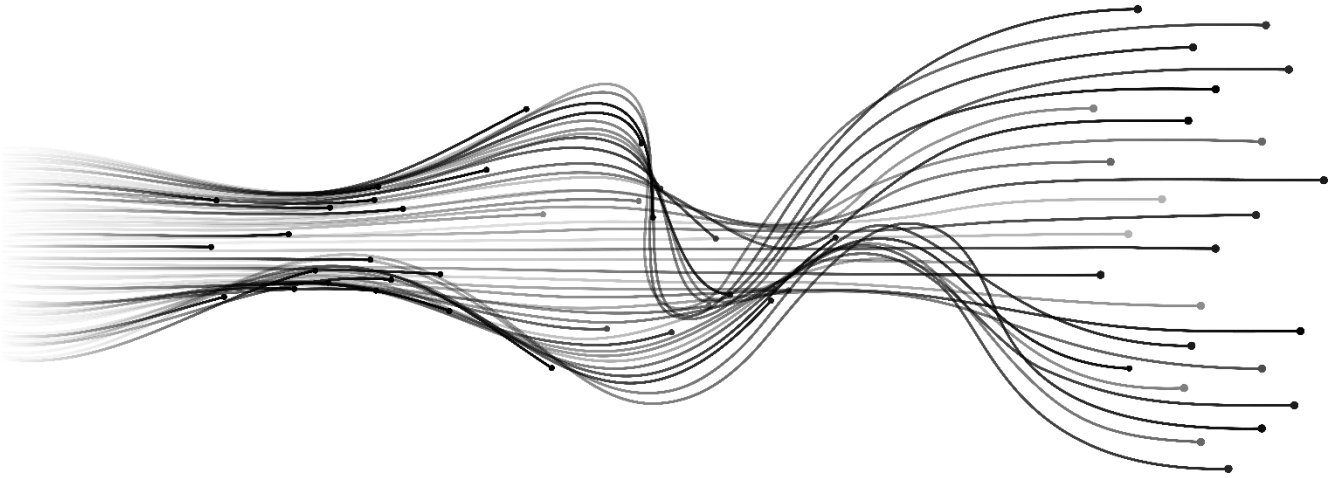
The eBook kicks things off with some interesting reflections of our industry partners, followed by an introduction on the FINDER Project. These chapters are followed up by elaboration on FINDER specific topics, leading up to the final chapters with conclusions and recommendations of our Early Stage Researchers.

The inputs are in all cases the fruits of collaboration between academia and practice and tap into the various cases and datasets that have been opened up by the FINDER team over the past few years. As such, it will undoubtedly be welcomed by doctoral students, researchers and managers with an interest in learning more about the impact of digitalization, corporate entrepreneurship, innovation management and strategic management.

Enjoy the read!

Prof. Dr. Rick Aalbers
Full Professor Corporate Restructuring & Innovation - Radboud University
Principal Investigator to the FINDER ITN program



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Foreword – a business perspective

It is a great pleasure to contribute into this Finder PhD program eBook and to share with you why I was excited when Rick Aalbers, my old friend, former KPMG Consulting colleague and now Professor at Radboud University, approached me in 2017 for teaming up to apply for the Marie-Curie grant funded by the European Commission. Rick, myself and Saeed Khanagha (Vrije University Amsterdam) started the extensive application process for this particular grant with Atos sponsorship by Daniel Cohen, Senior Vice President of Atos Financial Services (FS). Clearly, the grant application process was a tough one in order to navigate all its requirements and to design an attractive PhD program for all its stakeholders: PhD candidates in the first place, universities, Atos, its stakeholders, its ecosystem and our vertical FS industry solutions team. The application outcome: the project (FINDER) has received funding from the highly competitive European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie grant agreement No. 813095. The Finder program allowed us to fully fund four PhDs candidates. At the time, it was the second Marie Curie ITN in the history of the European Commission's Funding scheme to be awarded to a business School. What can I say, a fantastic joined result of our efforts.

Rick's PhD initiative was a perfect match to enrich our Fintech Engagement Program, that envisioned to scout and engage scale-ups into our vertical FS Industry go-2-market. This Atos program consisting of a specific 4-step approach FinNet (thought leadership & research), FinHub (engage), Finlab (test-drive) and Customer Engagement, aimed to position our company as a Chief Integrator of Fintechs for our Tier 1 and 2 customers. Evidently a fascinating environment for our ESRs to wonder around, getting exposed to the business side of collaborative innovation networks in practice. Our approach allows the Fintechs involved to scale and facilitated our customers to work with pre-vetted and quality assured, as well as road tested Fintechs to enrich their services, products and API's. The program – and thus all of the FINDER ESR candidates as well - worked with our industry thought-leaders and trendwatchers that allow us via a stringent selection process to identify, assess and partner with Fintechs that have the strongest possibility of driving new value to our customers and our eco-system.

Our thought leadership in the Fintech Engagement program was predominately based on our relationships with several main Fintech ecosystems such as Tech Quartier in Frankfurt, Holland Fintech, Fintech Connect, Finovate etc. and our in-house analyst & FS industry thought leaders tracking the trends in each of our go-2-market domains. Rick's initiative was a great way to add a PhD academic research perspective to our existing Fintech Engagement Program, allowing a scientific perspective on 5 Fintech research tracks. This thought leadership would give a different approach and positioning in the market and lead to new ways to engage our customers, our Fintech eco-system and team up concretely with four associated world top 150 universities: Radboud University (principal), Vrije University Amsterdam, University of Groningen, Warwick and KU Leuven.

Given the fact that we would apply for this particular Marie-Curie Grant, other special advantages came to the fore, one being that the PhD Candidates would for 50% of their time participate in our FS vertical industry

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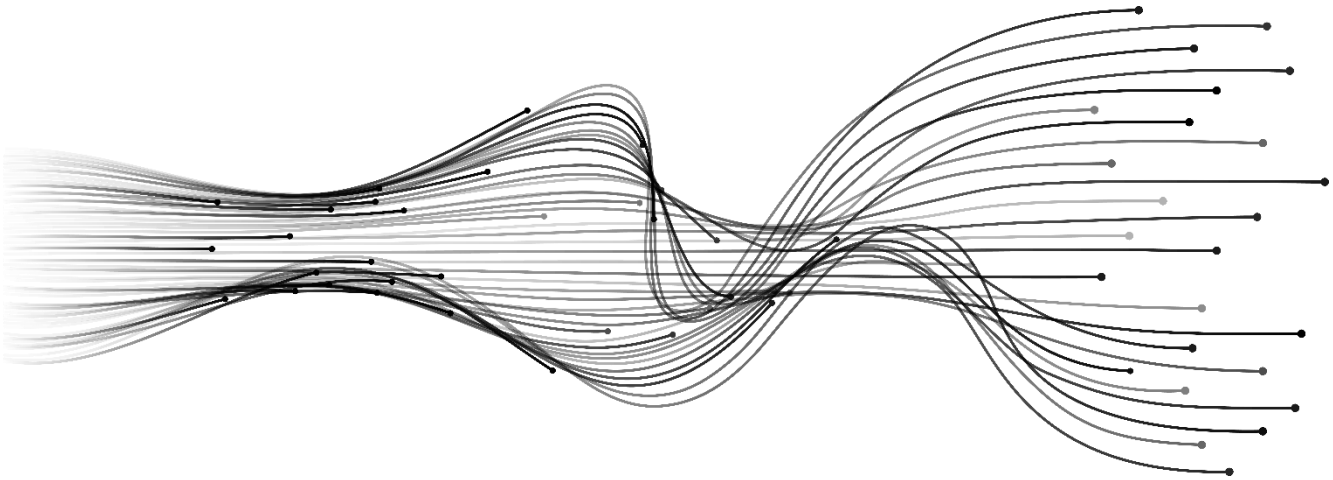
team providing us capacity with writing and publishing whitepapers, contributing to strategic research & development tracks, and organizing joined customer events.

Fast forward and several years later, we have had great success and many fantastic outcomes teaming up with around the Finder PhD program, the PhD candidates and our team. This eBook is a clear result of that. My team mates Ivo Luijendijk and Frederik Kerling will zoom in on some concrete results in the past year, as they supported the program in the day to day operations of the Finder Program.

Last but not least, I am extremely proud that we managed to make this rather unique Finder program a success with clear outcomes. For the me the most special one is to have provided four our PhD candidates (James, Ami, Jonas and Jonas) a life changing and career changing event. And may be one that I could look forward to myself.

Special thanks from my side to Rick, Linda, Saeed, Ivo, Frederik, Olaf, Eddy, Kuldip, Franck and of course the Finder Board and its four associated universities.

Remco Neuteboom
Senior Vice President, Chief Digital Officer, Global Financial Services, Atos



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Stakeholder reflections

Prefatory letter from Atos Global Financial Services and Insurance Industry Solutions & Alliances team

Ivo Luijendijk, Atos Group Industry Director Data Analytics and Emerging Technologies – Global Financial Services and member of the Scientific Community. After 15 years experience as a banking consulting, Ivo now drives business reinvention for the Atos global financial services clients.

Frederik Kerling – Head of Fintech and Quantum industry Director – Global Financial Services and member of the Scientific Community. Frederik is specialized in bridging the gap between complicated technologies and realistic commercially viable business outcomes, and is currently heading the Fintech Engagement program with Remco Neuteboom.

It is with great pleasure that we share a few words to the opening of this eBook, created by the 'fab four', the future Fintech rockstars we know as Ami, James, Jonas and Jonas. As we lead FINDER from the Atos side, we have worked directly with these four PhD candidates as they labored day-in-day-out on not only their academic development, but also on developing the business skills that will surely allow them one day to take leading positions in the uniquely collaborative innovation ecosystem that is Finance Technology.

We are thrilled to see this eBook come together as a collecting pool of academic research, business strategies and the combined thought leadership from both sides of this program. Much of what you will read in this eBook is the direct result of the collaboration between any of the four PhD candidates and one of the Atos FS&I Industry Directors working in Remco's team within Atos. As Industry Solutions team, we guided their thoughts and ideas and collaborated on many of the articles that adorn the pages that will follow. The deeply emerged cooperation between Radboud University's brain power and Atos' industry expertise resulted in a unique and fertile ground for our PhDs to work in and we feel that this eBook clearly reflects that quality.

During the last four (or so) years, we worked with the PhDs on the different deliverables that were agreed upon with our funding partner, the EU Horizon 2020 program. On top of those, the lively discussions in the group often led to additional blogs, papers, presentations and the likes thereof. It is with joy, and even some pride, we'd like to share some highlights from these with you here.

During March of 2021, Atos hosted "*Inclusive Digital Innovation in Financial Services and Insurance".* During this full-week event, we produced a daily webinar in which we highlighted key topics within this very important topic for banks and insurers: how to organize innovation within an ecosystem of banks, Fintechs, authorities and customers. Among the esteemed speakers, we welcomed Josemaria Sota (IESE Business School), Hubert Tardieu (GAIA-X), Nikhil Chouguley (Deutsche Bank), Remco Veenenberg (Fintech authority) and Jeremy Abiteboul (DreamQuark). Complemented with key experts from Atos and Radboud University, the webinars drew lively discussions from the various attendees from universities, Atos, our clients and partners, and various industry bodies.

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After a lively discussion in one of Radboud's classrooms, James and Ivo decided to write a paper about their respective views on the dominance within Fintech innovation ecosystems. With the help of George Dermowidjodo, a highly experienced and well-respected banking strategy consultant, they created a paper that focusses on the dynamics between all the participants in collaborative innovation. The resulting opinion paper "*Ecosystem dynamics: Understanding dominance and centrality in innovative ecosystems*", explores the collaborative innovation from the viewpoints of (incumbent) banks, Fintechs, ecosystem orchestrators and academia. The paper was peer-reviewed by the Atos Scientific Community and published on atos.net in October 2022, finding its way in the hands of hundreds of readers.

The final highlight we wish to recall are the two strategy days we organized during the closing months of the FINDER project. Atos hosted two full-day seminars on business innovation strategy and policy respectively, during the SMS London 2022 conference. During both seminars, we welcomed key leaders from both the academic and business world in our headquarters in London, where insightful presentations and passionate discussions were held to the benefit of a packed crowd. We remember vividly the great presentations by George Miller (Atos), Robert Hoskisson (George R. Brown Professor of Management, Rice University), and Mario Schijven (University of Illinois) who shared their insights in behavioral bias in the topic of the first day: "*Behavioral Biases and Corporate Transformation Strategies*". During the second day, the policy day on Fintech ecosystems, we distinctly remember Charleen Sparks (Lloyds Bank), who shared her experiences in orchestrating the Lloyds Bank Fintech sandbox.

For us, these highlights are obvious signs that combining academic brainpower with business acumen is a great way to elevate innovation to a new level. Another feather in the cap of the FINDER project and yet another reason to thank Rick Albers and Remco Neuteboom for their vision and hard work to bring us all together. We thank you very, very much for giving us the opportunity to be directly involved in the Finder program and equally thank Radboud University and Atos for hosting this great research program. Thanks also to Dan Cohen and Prof. Hans van Kranenburg for sponsoring us. Final thanks -and congratulations- go to James Ellis, Ami Wang, Jonas Röttger and Jonas Geisen. Working with you has been a great experience and a lot of fun. We hope, and fully expect, that we will meet again in this dynamic world of financial services & technology.

Lead the way and keep on rocking, fab four.

Ivo Luijendijk and Frederik Kerling

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Reflections on the FINDER Project by:

Himanshu Vyas, Chief Strategy Officer – Head of M&A and Strategic Partnerships, Global Financial Services at Atos. Himanshu's current focus is to develop and execute the Atos M&A and strategic partnership-based growth strategy for the Global Financial Services Market.

I initially got interested in the finder project because of its aim to synthesize complex data in a way that the learnings can be used both by the academics and the industry practitioners. My personal interests are in the area of Competitive Strategy, Mergers and Acquisitions and Digital innovations. The following streams in the project directly contributed to these interest areas and helped me contribute my knowledge as well as learn significantly from the research done in the program.

1. Managing innovation in the networked organization.
2. Dynamic capabilities for competitiveness in the digital era.
3. Alternative business models in digital ecosystems.

From the very first introductory meeting held at Radboud University Nijmegen campus, followed by significant online collaboration leading to the workshop held at the Warwick Business School location in London, I could feel that this project is providing a collaboration platform for the academics and the industry expects to come together and contribute towards solving these key industry challenges.

Over last few years I personally learned a lot from the professors, other industry colleagues and PHD students as well as was able to contribute and test my own ideas. It was an amazing journey, specifically when the world was in a shutdown because of Covid. The project brought some brightest minds together and kept the research going.

I am looking forward to continuing my engagement with friends I have made in the FINDER Project.

Himanshu Vyas

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Acknowledgement

FINDER joined forces across a number of leading academic and business institutions. Though Atos and Radboud University are principal partners driving this collaboration, without the wider team of academics and industry professionals supporting the core project team, we would not have been able to pull this off. We would like to take this opportunity to thank all FINDER friends for their unwavering support:

- Aalbers, Rick – Radboud University
- Badstübner, Olaf – Atos
- Beattie, Thomas – Voleo
- Berends, Hans - VU
- Buis, Linda – Radboud University
- Castellaneta, Francesco – SKEMA
- Claessens, Eddy – Atos
- Cohen, Dan – (former) Atos and Cognizant
- Coisnon, Frank – Atos
- Deken, Fleur - VU
- DesJardine, Mark – Dartmouth College
- Dunne, Phil – Ronald Berger
- Ellis, S. James – Radboud University
- Feldman, Emilie R. – University of Pennsylvania
- Friesl, Martin – Bamberg University
- Geisen, Jonas – Radboud University
- Groen, Arjan – (former) EY
- Heimeriks, Koen – Warwick Business School
- Hoskisson, Robert - Rice University
- Kerling, Frederik – Atos
- Khanagha, Saeed – VU
- Kranenburg, Hans van – Radboud University
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- Luijendijk, Ivo – Atos
- Markus, Arjan - TU
- McCarthy, Killian – RUG
- McNamara, Gerry – Michigan State University
- Neuteboom, Remco – Atos
- Norman, Jerry - Heineken Company
- Oever, Koen van den – Radboud University
- Palomares Fernandez, Susana – Atos
- Paroutis, Sotirios – Warwick Business School
- Prabucki, Carlos von – Atos
- Rossi, Andrea – Atos
- Röttger, Jonas – Radboud University
- Schäfer, Sebastian – TechQuartier
- Schavemaker, Mike – Philips
- Schijven, Mario - University of Illinois
- Sevarts, Jo – Atos
- Siota, Josemaria – IESE & World Economic Forum
- Smith, Mike – Atos
- Smits, Armand – Radboud University
- Snihur, Yuliya – Toulouse Business School
- Tardieu, Hubert – GAIA-X
- Tuertscher, Philipp – VU
- Vialle, Chris – Monitor Deloitte
- Vyas, Himanshu – Atos
- Wang, (Ami) Xiaolei – Radboud University
- Wilhelm, Miriam – WU Vienna
- Zehner, Jean-Francois – Atos

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The FINDER Project at large

The FINDER Project is a competitive Marie Curie research and training program funded by the European Committee, which stands for:

Fostering **I**nnovation **N**etworks in a **D**igital **Er**a.

The FINDER program sets out to foster innovation networks in a digital era. Appointed Marie Curie FINDER PhD fellows investigate the innovative collaborative arrangement among organizations as they inclusively explore digital technology for new product or market development.

The FINDER research scope spans industries and job functions, requiring candidates to synthesize complex information and to approach problems nimbly in a manner that can be transferred to both academics and practitioners. As such, it demands a sophisticated understanding of the context in which business is done, the effect of technology in driving these collaborative processes, and of the stakeholders involved. FINDER's integrated curriculum prepares students to drive change at the vanguard of business and technology by challenging them to consider multiple perspectives and to create innovative solutions to problems but in such a way that they are not only profitable to business but also relevant and responsible towards society at large.

FINDER's Objectives: Changing Perspectives

The main objective of the FINDER Project, instilled by Europe's Digital Future Outlook, is to improve the collaborative, digitalization-driven business ecosystems between incumbent and high-tech start-ups, as drivers of Europe's future innovation. As such, the overall project foresees to foster innovation networks in a digital era (FINDER).FINDER is focused on the exploration of innovative collaborative arrangements amongst organizations including; grassroots groups, incumbents, and wider society, as they inclusively explore digital technology for new products or market development.

Europe's Digital Future Outlook[1] urgently calls for smart, sustainable, and inclusive growth, aspiring to secure competitiveness in Europe through innovation. To reach these objectives, there is a European agenda seeking to secure competitiveness for European companies and citizens[2]. The ambition for digitally driven innovation implies a need for new business ecosystems, in which institutions, large corporations, SMEs and individuals in society will be interconnected by means of digitalization, in unprecedented ways. These innovative, yet complex, inter- organizational networks, made up of both industry incumbent and high-tech start-ups, will hopefully serve as prominent engines for future innovation within Europe's business landscape. Many emerging digital technologies promise to have a transformational and disruptive effect on business and society at large. The benefits of new digital technology, however, are not always easy to reap, both for grassroots-emerging parties, lacking the

1 European Commission, (2014). Europe's Growth Strategy. Luxemburg, European Union.
2 European Commission, (2014). Digital Agenda for Europe (http://ec.europa.eu/digital-agenda)

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network to get traction on their next new bright idea, but also for incumbents, that is, established players that may lack the sensitivity for the newest and latest. As a result, our broader society may miss out, as entrepreneurial potential remains untapped, and knowledge is unevenly distributed across parties.

FINDER aims to advance scientific knowledge regarding the management of innovation, in the context of the emergent digital landscape. Prior research points out that innovation requires a smart combination of multiple parties, diversity of insights and technologies, bringing value to all parties involved. FINDER seeks to examine the benefits and success factors of leveraging the connected world, to include marginalized members of society, as well as employees of corporations, in the process of innovation. Conventional views of innovation implicitly conceptualize development as a form of generalized economic growth. In contrast, inclusive innovation explicitly conceives development in terms of the active inclusion of those who are excluded from the mainstream of development, those, that is, who are currently marginalized[3].

[3] Foster, C. & Heeks, R.B. (2013). Conceptualizing inclusive innovation: modifying systems of innovation frameworks to understand diffusion of new technology to low-income consumers, European Journal of Development Research, 25(3), 333-355.

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FINDER focuses on inclusive innovation, balancing financial and social returns for entrepreneurs or corporate companies, and developing and implementing these. FINDER's objective is thus to create positive economic and social impact for entrepreneurs, corporate companies and wider society. The project seeks to identify the multiple ways through which inclusive innovation can sustain existing practices of a company; or can boost other newly emerging entrepreneurial activities by jointly venturing into new markets, or by jointly developing new products[4]. Inclusiveness, additionally, revolves around leveraging the benefits of innovation for society as a whole.

FINDER acknowledges that digitally driven business ecosystems are novel and complex social systems, crossing industry and organizational boundaries; they are thus not easy to understand. Yet, as platforms for future innovation, they must and can be managed. FINDER directs the way that policy-makers and organizations can navigate and coordinate these business ecosystems, to produce continuous innovative effects, thus fueling subsequent economic growth and employability. As the project seeks to foster innovation networks in a digital era, it incorporates in its design:

- the involvement of the economically and socially marginalized,
- It explores the relation between innovative collaborative arrangements amongst organizations, and
- the inclusiveness-related societal benefits, that are the result of such partnerships in terms of income and access to resources.

By combining inter-disciplinary and complimentary training within European Industrial Doctorates, FINDER aspires to look deeply into Europe's financial services sector, as it is being reshaped because of institutional and digitally-instilled innovative pressures. This sector serves as a forerunner in the utilization of digitally driven inter-organizational networks. The scope of this research allows us to identify the necessary changes that are required for innovation during and after digital transformation, exposing the ESRs to experience the dynamics of digital transformation, in relation to inclusive innovation up close. FINDER embraces inclusivity as a 'win-win game' for those involved in developing Europe's future innovation networks in the digital era, as businesses are increasingly aware that inclusivity is not only beneficial for marginalized communities, but also for the businesses themselves.

FINDER operates through five dedicated research tracks, all pivoting around the same theme:

Innovative Fintech collaborations

[4] Aalbers, H.L., & Dolfsma, W.A. (2015). Innovation Networks: Managing the networked organization, Routledge, London, New York.

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FINDER Research themes

FINDER accommodates four high caliber and full-time PhD positions, facilitating first class PhD training, as well as first class in-company training at the crossroads of Fintech academia and business. A team of affiliated Marie Curie FINDER PhD fellows investigate the innovative collaborative arrangement amongst organizations – grassroots, incumbents and the wider society – as they inclusively explore digital technology for new product or market development.

Unique features of this European Industrial Doctorate are:

- an in-depth investigation of innovation dynamics at emergent ecosystems and complex organizations;
- industry-led complementary training in the domains of Professional Innovation Management;
- a bespoke program of FINDER network events that bring together doctoral researchers, academics, practicing managers and policymakers interested in innovation;
- 18 months' placement at one of Atos' major European business hubs.

The following 5 topics line out the future of Fintech collaboration in a complex stakeholder field, and include:

1. Managing innovation in the networked organization.
2. Dynamic capabilities for competitiveness in the digital era.
3. Alternative business models in digital ecosystems.
4. Seizing the future: fostering collaborative entrepreneurship.
5. Effective strategies and policies for enhanced social payoff, during and after digital transformation.

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Project 1: Managing innovation in the networked organization

The advancement of digital technologies has created new opportunities for identifying, absorbing and utilizing original knowledge that, in turn, enable innovation. The exponential growth in the volume and pace of available knowledge requires new approaches and practices for the management of innovation. These practices include collaborative and open processes and routines for the generation of new ideas, for filtering and selecting ideas and finally for implementing the selected ideas. Moreover, appropriate organizational structures and governance mechanisms need to be in place to support this process, enabling to deal with a multitude of stakeholders, as found in digital technology-driven fields for innovation such as Europe's reorienting financial services sector. Close attention is paid to managerial practices, which revolve around including people at different levels of organizations, as well as people outside organizations, in strategy and innovation processes.

Central Research Question:

How do digital technologies influence systems, practices and processes for the effective management of innovation within and across organizations?

Project 2: Dynamic capabilities for competitiveness in the digital era

Many established firms have failed to adapt effectively to the disruptive forces in the environment. Recent examples of this phenomenon include Blockbuster, Eastman Kodak, HMV, Lehman Brothers and Nokia. Such failures tend to be particularly prevalent when the nature of external change is discontinuous, similar to what the digital transformation has involved. The digital transformation requires firms to reconfigure their existing ways of working, in a sense of rethinking their assumptions about how to succeed in their chosen industry. Europe's financial services are an example of such industries, shaken up by the recent advancements in digital technology. Incumbents need to adjust their processes and to organize in ways that allow for sensing and seizing external emerging opportunities. The adaptation processes require bottom-up, horizontal and top-down flows of knowledge-sharing, decision-making and resource allocation processes.

Central Research Questions:

What firm level and individual level factors give rise to organizations' adaptability in response to disruptive forces? How?

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Project 3: Alternative business models in digital ecosystems

In good times and bad, firms regularly reshape themselves. Firms may re-align organization structure with strategy and changed external circumstances (Gulati & Puranam, 2009), intervene to stimulate specific activities (Aalbers, 2020; Okhuysen & Eisenhardt, 2002) or downsize during challenging times (Dougherty & Bowman, 1995). Even under such challenging circumstances, entrepreneurship continues to take place. Intra-entrepreneurs often have to build organizations in order to perform activities for which markets are not yet ready, or even are the first to render solutions to navigate out of crisis. Accordingly, entrepreneurs and managers must consider the design of business models and even build businesses to execute transactions which cannot yet be performed in the market. While reshaping firms (e.g. changing structure or size) is both important and frequent, it is also relatively understudied. Moreover, extant research (e.g. on downsizing and turnaround) typically focuses on traditional outcomes (e.g. profits) with less emphasis on such things as collaboration, knowledge creation and innovation at the individual or team levels. The study of business models at the intersection of strategy and entrepreneurship research involves an exploration of how firms do business at the system-level under such challenging conditions. These are conditions typically to be expected, also in the wake of COVID-19, with economic prospects scaling down substantially across various industries. Such interdisciplinary investigations are essential to understand how firms may re-align organization structure with strategy during suddenly changing external circumstances, with the implications of digital transformation potentially helping different emergent ecosystem actors to outperform in this new landscape. Europe's financial services industry presents an example of this type of dynamics, facing both technology-driven as well as institutionally-driven challenges in re-inventing and exploring alternative business models as well as entering into economically uncertain times as economic crisis looms on the horizon.

Central Research Questions:

What are the characteristics of alternative business models in digital ecosystems? Which factors facilitate their development?

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Project 4: Seizing the future: fostering collaborative entrepreneurship

It is essential to look into the dynamics of entrepreneurship networks within the digital ecosystem. In particular, the way that networks of entrepreneurship can be fostered by system-level factors is explored, as well as the way that activities and initiatives are driven by large organizations. When it comes to digital transformation, limited effort has been devoted to researching the internal organization of entrepreneurial ventures and the constitutive elements of the internal organization in firms. There is an interesting variety among technology start-ups and significant deviancies from the standard evolutionary path which indicates opportunities for founders to make key choices with consequences for a venture's future success. Different modes of collaborative entrepreneurship may drive different learning routines across the ecosystem that are important to understand before it becomes viable to scale-up successful business models to other domains. Creating guidelines for entrepreneurs and for effective new business creation in the digital era.

Central Research Questions:

What are the internal and external contingencies that explain the diverse organizational arrangements seen in new ventures? How does the internal organization of entrepreneurial ventures interact with governance, ownership, industry and geography?

Project 5: Effective strategies and policies for enhanced social payoff, during and after digital transformation

This project looks into the societal impact of digital transformation and the way that sustainable strategies by organizations can benefit a society during and after a digital transformation. Organizations individually and collectively play critical roles in sustainability aspects of the digital transformation, as they develop new products, processes and technologies; establish common industry standards, and negotiate for regulatory support. Next to institutional forces effectuating social payoff, strategic action by organizations may also instill (unforeseen) social payoff to society as resources get reallocated elsewhere and as employees get reemployed, which potentially infuses external innovation. Because of the magnitude of the challenges and the complexity that comes with such paradoxical forces, digital transformation needs to be investigated from a sustainability perspective.

Central Research Questions:

What are the roles, challenges and opportunities for incumbent firms and newcomers for a sustainable transition to digital technologies? How can organizations overcome struggles over the meaning of sustainability, within and across organizational fields, as the digital ecosystem unfolds?

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Chapter 1
Fintech Startups: navigating stormy waters in the financial realm?

Fintechs are a central actor trailblazing innovation in the financial sector. However, the central question of how these young start-ups focused on financial technology can be efficiently incorporated into the transformation remains. The liability of newness and smallness are difficulties every new found innovator has to face. The liability of newness describes the risk of a firm dying, which is highest early on in its lifecycle. The liability of smallness refers to the risk induced by limited resources and capabilities which makes start-ups especially vulnerable. This could, in the worst case, endanger a start-up's survivability due to their lack of financial resources and track record. These dangers render the scaling process a major challenge. The chosen articles in this chapter propose that this can be overcome by fostering partnerships that utilize Fintechs in interorganizational innovation programs. Intermarrying established actors of the financial industry and Fintechs promises a fruitful relationship through mutual compensation of weaknesses.

Fintech programs for long term innovation

– by Frederik Kerling, Global Portfolio leader and quantum industry director Global Financial Services and member of the Scientific Community & Rick Aalbers (Radboud University) –

Stability-urge in working with Fintechs can hamper long term innovation. The financial services markets tend to acquire Fintechs to ensure a stable delivery of innovative solutions. Critics from both business and academia have recently started to raise a series of doubts on this growth strategy, suggesting it hinders the longer-term innovation project capability of incumbent firms, and that we need a different method to ensure that we can do this for the greater challenges.

There are dozens of types of Fintechs: InsurTech, RegTech, BankingTech, WealthTech, and so on. Though the names differ, these Fintechs tend to meet similar ends; they either fail, or get acquired. All but a select few outgrow their scale-up phase and remain an independent corporation. So few that we encourage the reader to comment with good examples thereof. But what are the purposes of acquiring these Fintechs exactly? And where does the potential mismatch between start up and incumbent growth strategies come from? A question arising is whether this "fail or acquire" is a symptom of the Fintechs or a symptom of the financial markets as a whole.

In general, numbers tend to present a rather gloomy picture when it comes to growth prospects. Of all startups started in the US, for instance around 92% fail within 10 years. Research shows that 21.5% of startups fail in the first year, 30% of the survivors in the second year, 50% of the survivors in the fifth year, and 70% by their 10th year[5]. They fail for good reasons: lack of industry knowledge, forceful innovation, overlooked legal aspects, ignored the challenge of onboarding customers, overcomplicated their solution, lacked a proper sales and marketing strategy, ignored economic cycles, lacked the ability to quickly pivot and adapt, had limited technical background, or decided to go at it alone when partnering up would have been preferred[6]. It seems that the high failure rate is a natural and healthy consequence of making a business function successfully.

[5] National Business Capital and Services. "2019 Small Business Failure Rate: Startup Statistics by Industry

[6] https://codeandpepper.com/top-10-reasons-why-Fintech-startups-fail/

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Nevertheless, in the case of acquisitions this does not seem so natural (Hernandez & Shaver, 2019). Acquisitions mean that firms apply the external growth strategy (or the inorganic growth strategy) wherein a company uses external resources and capabilities, rather than available internal resources, to expand its business activities. For example, there is an obvious financial incentive for the Fintech's owners to get acquired, but an acquisition means landing in a corporation that has stricter procedures, less overall agility, different targets and partners, and overall limits the possible clients. In short, Fintechs let go of their familiar ways of working that made them grow in the first place. But why? One could wager on that it is in the Fintech's interest to be acquired. Perhaps they had difficulties in scaling up, or they reached a maturity level that allowed them to cater to a large and diverse range of clients. Perhaps they wanted to be able to refocus on that core development stage they once originated from and left all the rest to others? Or perhaps they were tired of it all and simply wanted to move on.

From the acquirer's perspective, we would surmise that acquiring Fintechs is stability driven. For instance, because one wants to acquire a significant technological edge over the competition and sustain it in classical business models. Most acquiring organizations do not have the ability to create a stable stream innovation to provide stability, and rather try to fill their stability needs in conventional means (McCarthy & Aalbers, 2022). For example, the similarity between the businesses of the firm and its partner's acquisition target restricts the firm's ability to create a more stable innovative performance (Lavie, Lunnan, & Truong, 2022). Thus, we think a lot of the major stake acquisitions happen because of this need. One cannot create a stable business on the solution of a partner that can be easily bought by the competition. We suppose that this acquisition practice is in fact self-destructive for the Fintech process and overall long-term innovation, due to implications of business similarity that undermines the firm's ability to benefit from synergies from their acquiring targets.

There are around 27,000 Fintechs in the world at this moment[7]. At an 8% survival rate, this still leaves well over 2,000 serious contenders. This raises the question: where does all this innovation power eventually go after acquisition? Is the people-lead innovation power incorporated, or do they just leave and start the Fintech cycle anew? It seems that the need for stable innovative solutions within the financial services industry causes an impediment in developing solutions and practices that require a longer development period. Thus, there are challenges in the regulations and policies for considering the long development period.

An illustration of this is the inevitable challenge of decarbonizing, the creation of a completely carbon-neutral economy. What these developments require and expect from global financial services is huge, and even though individual Fintechs can contribute to it, the current average Fintech lifecycle cannot deal with the overall long-term problem the industry faces.

[7] https://www.statista.com/statistics/893954/number-Fintech-startups-by-region/

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Perhaps this is one way a partner with a long-term vision and scope can make a difference. If a program exists that can capture and promote long-term visions and goals, such as decarbonization, within a Fintech program that builds with multiple generations of themed Fintechs and closely aligned client bases, then we can safeguard the innovation power Fintech brings and provide the stability we require. This is ideal for challenges that exceed any single Fintech, client or partner, and speeds up long-term changes to the financial markets.

Additional research in this area shows that when considering the balance of stability and innovation at the industrial level, the top management teams and policymakers may consider the implications of business similarity and complementarity to enhance the firm's ability to create and capture value from the acquiring moves (Lavie et al., 2022).

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The Fintech Bounce Back effect

– by Ivo Luijendijk, Global Industry Director Financial Services & Insurance, Global Blockchain Director and member of the Atos Scientific Community & Rick Aalbers (Radboud University) –

We'll bounce back from COVID-19,
but let's agree not to bounce back from digitalization

The world is increasingly dynamic, if not almost manic, when it comes to the absorption of sudden exogenous shocks to the current global economic and social system. As we mention this, the entire world was, and still is building their respective societies back up to pre-COVID-19. Vaccination programs, led by the pharmaceuticals and orchestrated by governments and NGOs are finally giving us confidence that the global pandemic can be controlled. It may require a single global vaccination round or it may become a yearly requirement for a healthy and open society. Who can tell? Most importantly, we are bouncing back.

In the meantime, life has continued. While our national healthcare heroes are doing their very best to limit human casualties, governments are trying their best to limit corporate casualties - especially those hit hardest by lock-downs. Industries like travel, leisure and major events saw their entire business evaporate. Other industries faced diminished incomes and increased pressure on internal operations due to employee sickness and the sudden need to work remotely (Feyisa, 2020). No quicker walks to that colleague who can fix that credit approval issue, or a chance encounter at the coffee machine that helps you close a problematic insurance claim. Working from home is an entirely different experience, while the need for efficiency, speed and agility remained (Korbel & Stegle, 2020).

In practice, the financial services and insurance industry (FS&I) saw a perfect storm of lost revenue (late payments and defaults), increased work pressure (requests for financing through rough times) and of course the effects of the sudden need to work from home. In response to these issues, many FS&I clients accelerated their automation and digital transformation projects.

Research on this account points out that how firms can provide strategic responses to potential crises and new digital technologies transformation may also shift the basis of firms' strategies that force them to re-evaluate their competitive advantage (Wenzel, Stanske, & Lieberman, 2020).

At Atos, we strongly believe that the new digital and distributed way of working imposed by the COVID-19 crisis is sustainable and can lead to better outcomes for companies that fully embrace the change. In that regard, the focus should not be "will we all work from home?" or "will we all come back to the office?", but rather "how can we make work frictionless in every environment?"

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Applying digitalization technologies like AI, RPA (Robotic Process Automation) and block chain reduced the cost per unit as fewer manual actions were required, and includes the added benefit of reduced risk of mistakes or fraud. It also improves end-to-end processing time per unit and it allows for more structured digital processing of files and documents. The created structure helps to minimize the impact of operational teams working remotely. Sure, technology is not a full replacement of good-old human efficiency, but we have to admit that automation can help organizations focus their people resources in the right areas and augment and improve operational efficiency. At least, automation can be transformational if we implement it correctly.

In other words, we need to fully embrace digitalization as a whole to unify companies, starting with a renewed digital strategy that enables 'frictionless working'. Most of the world planned and assumed we will all be able to work in offices again after summer of 2021. As researched by McKinsey in November of 2020, many business leaders fully intend to maintain and leverage the new tech-enabled work efficiencies to increase employee satisfaction and minimize location-based risks.

Atos is very curious to see if business leaders will truly embrace the possibilities of digitalization or revert to old more customary ways of working. We'd like to challenge all business leaders today to not only keep the current COVID-19 investments, but to push innovation to discover the optimal combination of human and technology that yields the highest efficiency! With new levels of awareness and acceptance, we could finally allow digitalization technology to fulfill its potential and transform the way we work.

All in all, a dynamic environment is in need of further interpretation when it comes to startups and incumbents alike – developing a sophisticated understanding of the context in which their business is done, the effect of technology in driving these collaborative processes, and of the stakeholders involved.

Here is some practice derived predictions for the next two years to kick off such reflection:

The new standard way of working will be a healthy mix of working in the office when needed and working from home when possible. This would strongly improve employee's work-life balance and have a drastic impact on carbon emission through traffic. A big improvement in the quality of work done by employees. Menial tasks will be automated, allowing employees to focus on the higher quality tasks that can only be performed by humans – at least today. Imagine the innovation that could come from the freedom to think ahead and work on experimental and breakthrough projects that are normally impossible due to resource limitations. We can't wait to see what innovations develop from this mental freedom. Interestingly enough, these predictions seem to resonate as well in current academic insights that have revealed that geographic flexibility derives greater productivity (Choudhury et al., 2021).

Necessity is the mother of invention, which is in line with Plato's belief. Perhaps the one benefit we can see coming from our latest pandemic is that we are more ready to embrace technology as an important component of our operations, for instance intelligent automation (AI and RPA), blockchain contracts (DLT), quantum computer power and other digitalization powerhouses. And who knows, maybe in a few years time we can look back at this ink-black page in human history and realize it was an event horizon

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for humanity, which transformed our society into a more digital world where personal freedom allows us to grow beyond the current business paradigm of a mandatory 40 hours workweek in an office.

As we have seen that the dynamic world is eager to transform and adapt if necessary, this is promising for exploring possibilities for digitalization. However, these possibilities need to be embraced in order to actually enact change. So, business leaders, please accept this invitation to really transform the way we work. We all need it, in multiple ways. More freedom, more invention, faster progress, less strain on the environment and a definite competitive advantage for the early adopters. If there is a down-side, we don't see it.

Additional research in this area shows how leadership integrates the crisis management perspective in a post-pandemic (Hitt, Arregle, & Holmes Jr, 2021). The business leaders can learn from the recent study the Work-from-anywhere (WFA) programs, which are likely preferable for workers as it offers a non-pecuniary benefit with more temporal and geographic flexibility than traditional work-from-home (WFH) programs (Choudhury, Foroughi, & Larson, 2021).

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Identifying and navigating tensions in the scaling process

– by Tze Yeen Liew (affiliated until September 2020) and (Ami) Xiaolei Wang, FINDER ESR –

Organizations are often fraught with tensions, and start-ups are no exception to this. Despite start-ups' focal role in job creation, the vast majority of them fail during the scaling phase. As start-ups are young firms with few learned routines, they are better positioned to absorb new technologies and to reconfigure their business models so that they are more resonant with market conditions. On the other hand, this instability predisposes them to potentially fatal resource and stakeholder tensions. The lack of clarity over the growth processes of start-ups and new ventures, an overemphasis on discovering idiosyncratic factors, and a preoccupation with static stage-based models in business growth scholarship, ultimately confer little understanding of why some start-ups successfully overcome said tensions while others fail. This section aims to answer the research question: How do start-ups overcome tensions during the scaling phase to achieve successful outcomes?

There are several issues that require consideration from the policy and regulatory perspective for a startup to scale up successfully, and our research has implications for managers, entrepreneurs and policy makers alike.

Background

Start-ups are also known as new ventures or new venture start-ups (Baptista & Preto, 2011; Zimmerman & Zeitz, 2002) and play a focal role in new job creation (Kane, 2010) and economic outcomes. Even though they have economic significance, survival rates for start-ups have been and still remain abysmal. Both old and new studies (Giardino, Wang, & Abrahamsson, 2014; Zimmerman & Zeitz, 2002) have approximated failure rates laying between 40% and 75%, many of which never become profitable. Management literature tried to identify macro and organizational level tensions that affect the resilience of start-ups, and they also discussed potential reasons for failure, such as resource scarcities (Cooper, Gimeno-Gascon, & Woo, 1991; Miron-Spektor, Ingram, Keller, Smith, & Lewis, 2018), alignment in strategy and execution within the organization (Giardino et al., 2014; Zimmerman & Zeitz, 2002), coopetition with incumbents, and high barriers of entry (Ansari et al., 2016).

The vast majority of start-ups fail during the 'scaling' process (Marmer et al., 2011). Often applied by practitioners and experts alike as a 'buzzword' to describe the rapid growth of start-ups, the dimensions of the concept itself and how it differs from or overlaps with related constructs such as organizational growth are poorly understood (Simsek et al, 2018). Traditionally, scaling has been used as a verb to refer to the act of climbing up a wall or mountain (Cambridge Dictionary, 2019). A related term 'scale up' [as an action] has entered business jargon to mean 'to increase the size, amount, or extent of something' (Merriam-Webster, 2019). However, the dictionary also notes a more recent business use for 'scaling': 'To grow or expand in a proportional and usually profitable way'. The dictionary traces the first usage of the term to author Connie Bruck in her 2006 New York Times article about microfinancing, which is

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incidentally a subtype of Fintech (Bruck, 2006). Nevertheless, our understanding of what challenges are endemic to the scaling process and how entrepreneurial firms manage them remains tenuous (Coad, Cowling, & Siepel, 2017; DeSantola & Gulati, 2017).

Although how the term 'scaling' subsequently managed to gain traction in the realm of new ventures is unknown, the mention of proportionality suggests there is a trade-off or a tension that exists between the factors involved, and that a balance has to be negotiated or struck. A survey of popular industry publications reveals that 'scaling' is often used to loosely describe sales or output that is not hampered or constrained by the lack of resources (McKinsey, 2014; PwC 2013) or some variant of sustainable growth (Accenture 2019; KPMG, 2017). Indeed, the scaling process is fraught with tensions arising from conflicting demands of business continuity and change (DeSantola & Gulati, 2017) that are exacerbated by resource scarcities (Smith & Lewis, 2011). Two of the most oft-cited reasons for start-up failure is the lack of cash and insufficient market demand (CB Insights, 2018; Anon., personal communication, 12th July 2019). As such, start-ups are incentivized to work with large incumbents to gain access to resources and an established customer base. However, this can give way to inter-organizational tensions (Fernandez, Le Roy, & Gnyawali, 2014); such as tensions of creation-appropriation (Bouncken & Reuschl, 2018) and collaborative-control (Sundaramurthy & Lewis, 2003), and coopetition (Ansari et al., 2016) with the very incumbents they engage. On an individual level; the lack of slack resources (such as time and money) to allow for mistakes and learning sensitizes employees existing tensions, as well as prompting recognition of latent tensions (Smith & Lewis, 2011) from competing demands that might not have existed before, such as fulfilling both marketing and design duties simultaneously. The lack of resources increases the stake of their decisions as employees will now have to compare and choose between contrasting goals to allocate their limited resources to (Kanfer & Ackerman, 1989). In this instance, an abundance of time would allow employees to 'shift' between demands (Smith & Lewis, 2011), hence addressing each fully (Sun & Frese, 2013).

In their conceptual review of scaling, (DeSantola & Gulati, 2017) renew calls for longitudinal research to 'track the internal development of entrepreneurial ventures'; and how resultant tensions between team members, organizational design and culture can be navigated. Tensions are 'individual level constructs' (Bengtsson & Raza-Ullah, 2016) derived from 'contradictory relationships between courses of actions, goals and demands of two organizational actors at the strategic level' (Van Fenema & Loebbecke, 2014) which cannot be resolved and will continually resurface over time (Smith & Tracey, 2016) . Although successful management of tensions enhances innovation and performance of a firm (Ansari et al., 2016; Schad, Lewis, Raisch, & Smith, 2016), tensions can also elicit anxiety in employees, which can manifest in defensive actions on the firm level (Schad et al., 2016).

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The lack of clarity over the growth processes (Mason & Brown, 2014) of start-ups and new ventures, an overemphasis on discovering idiosyncratic factors, and a preoccupation with static stage-based models (Levie & Lichtenstein, 2010) in business growth scholarship (Dobbs & Hamilton, 2007) ultimately confers little understanding of why some start-ups successfully overcome said tensions and some fail. By building on the micro foundations agenda of understanding how firm level performance emerges from the 'actions and interactions of lower level organizational members' (Foss & Pedersen, 2004), understanding what these scaling related tensions are and how individual employees respond to them cognitively, behaviorally and emotionally (Miron-Spektor et al., 2018; Schad et al., 2016) is instrumental to addressing this gap. Additionally, there is robust evidence in management in literature indicating that successful navigation of paradoxical tensions is key to firm survival and long-term performance (Chung & Beamish, 2010; Schad et al., 2016; Smith, Lewis, & Tushman, 2011).

In order to further our understanding of these micro foundations, additional research on the role of physical spaces is warranted as co-working spaces are a unique, yet understudied feature of start-up activity. Although a significant number of start-ups operate from co-working spaces (Bouncken & Reuschl, 2018; Hughes, Ireland, & Morgan, 2007), extant research on its role in mediating tensions through the enabling of physical proximity and sharing of facilities with other start-ups remains minimal (Lê & Bednarek, 2017). This topic of inquiry also fits with the emergent movement by management scholars in understanding the roles of objects and spaces in knowledge sharing, collaboration, and coordination as part of the tension management process (Aoki, 2020; Carlile, Nicolini, Langley, & Tsoukas, 2013; Jarzabkowski, Lê, & Van de Ven, 2013).

The evolving landscape of Fintech

'Fintech', a portmanteau of Financial Technology, is broadly construed as 'technology enabled financial solutions' (Arner, Barberis, & Buckley, 2015), although present-day mentions of Fintech are often made in reference to the disruptiveness, and not the presence, of technology in the financial industry. The significant intertwining of value creation and technology (Morel et al, 2017), which is accelerated by changing consumer behavior and the digitalization of financial data, has ushered in 'a new industry' (Schueffel, 2016). The Fintech industry consists of startups that develop focused solutions along the different constituent parts of the financial value chain (Morel et al, 2017). These start-ups are small tech firms well steeped in the 'mission of disintermediation' by removing redundant intermediaries in financial services and disrupting the monopolies of financial incumbents (such as banks). With global investments in Fintech clocking in at US$111.8 billion last year alone (Mostowyk, 2019), investors and consumers are optimistic that continued development in the industry will ultimately bring exponential returns.

Rapid and sustainable growth for Fintech start-ups is almost as coveted as it is elusive - roughly 90% of Fintechs fail when they reach the scale-up phase (MEDICI, 2018), significantly higher than the recent approximation of tech start up failure rates at 70% (CB Insights, 2019). Scaling Fintechs often struggle to find a balance between growing their customer base and maintaining solvency (CB Insights, 2019).

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Various factors have been proposed to explain these grim percentages; including the lack of early-stage funding (Startup Genome, 2017; MEDICI, 2018), premature scaling (GENOME, 2018; Marmer et al., 2011), relative distance from major financial hubs (Cumming, Hervé, Manthé, & Schwienbacher, 2018), and high barriers of entry (Romānova & Kudinska, 2016).

The advent of the Payment Services Directive 2 (PSD2) and Open Banking has created a huge boom regarding the extent that strategic partnerships can be formed between Fintechs and other financial institutions. Specifically, the PSD2 legislation has brought about the democratization of financial data previously only within the stranglehold of financial incumbents, allowing third parties such as Fintechs easier access to customer information. Fintechs, which have been predicting their success on being the leaders of financial disintermediation (PWC, 2016), have at their disposal the options of bundling (Barba Navaretti, Giacomo, & Pozzolo, 2017) and reintermediation (Balyuk & Davydenko, 2019) of financial products as an alternative strategy in obtaining the requisite resources to scale. Financial incumbents, on the other hand, are motivated by potential future benefits of leveraging an external source of innovation; or to cement alliances with a potential competitor.

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The aforementioned developments - the increased utility and thereby significance of data, regulations and norms shaping how data can be used, the transformations through Fintechs, and within firms - have paved the way for a new perspective on interorganizational relationships and networks. The following chapter is dedicated to providing an insight into the newly emerged perspective of such interorganizational activities within ecosystems.

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Chapter 2
Ecosystems as a new form of market organization

Starting off by abridging the former topics with ecosystems, this chapter further dives into the definition and orchestration as contemporary central questions to understand this organizational form. The academic progress presented hereafter provides insights useful for both practitioners engaging in ecosystems as well as policy-makers who want to support the emergence of ecosystems as drivers of innovation.

Volatility precedes standardization

– by S. James Ellis, FINDER ESR –

The financial services ecosystem is experiencing innovation at breakneck speed, as can be seen within the walls of Fintech-heavy startup incubators such as TechQuartier. Regulations – PSD2 and MiFID II for instance – from the topside constrain the direction of innovation, usually with consumer protection as the driving force. However, a third force is equally in play: standards. Standards are independent from regulations, in that 'regulations stem primarily from a top-down approach, while formal standards are typically the result of a market-driven process' (Büthe & Mattli, 2011).

Ecosystems are groups of interacting firms, where interaction is largely of collaborative and/or interdependent from nature (Jacobides et al., 2018). The standards of interaction especially in digital ecosystems are critical; APIs must be able to interact, programming languages must be mutually intelligible, the data that certain services rely on to provide value must be created and packaged in workable ways, and so on. A lack of adherence to these standards would mean for instance, that the smartphone in your pocket that you use for mobile banking, equities trading, and payment processing would figuratively fall apart.

However, standards, especially in uncertain environments, take time to formulate. During this process multiple parties might attempt to control the outcome of standardization, likely in their stakeholders' interests alongside their own. As Dr. Philipp Tuertscher commented in a FINDER meeting, standards are fairly mundane once enacted, but their formation is highly political and an interesting phenomenon to observe.

An easy opportunity to watch this process is in the standardization of corporate ESG data reporting for investors. In the financial services ecosystem, this is a huge step ahead of MiFID II's full implementation. In this section, we'll briefly cover these terms and discuss what's happened thus far, which will set a baseline for a future series of essays covering key events, lessons learned, and theoretical takeaways from data collection during the ESG data standards-setting process.

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ESG Data

ESG stands for environmental, social, and governance. This category of data has experienced a proliferation of importance alongside corporate social responsibility(CSR) initiatives. The three subcategories of data when considering a company, cover aspects such as gender wage gaps, environmental waste protocols and anti-corruption protections.

Until recently, the disclosure of ESG data has been generally voluntary with some exceptions. As such, industrialized ESG data production itself has not been a heavily regimented practice, so it's largely been the efforts of NGOs, watchdog groups, investor discretion, and so on that have pushed companies to publish ESG data, since ESG data has not been directly monetizable (a familiar trait of all so-called "alternative data," a category to which ESG has historically been ascribed).

However, self-generated reports of CSR performance are riddled with inconsistencies and gaps for obvious reasons. To address this, agencies and companies such as MSCI and Sustainalytics began publishing independent ESG ratings on mostly publicly listed companies And over time, this practice has gained enough importance with institutional investors and asset managers that there are even ecosystems of sustainability ratings agencies, that mostly have their own unique methodologies and outputs.

While the proliferation of ESG reporting is generally good, there are obvious problems. Asset managers who are on the hunt for comprehensive data towards a given publicly listed firm's CSR performance, are confronted with a blurry landscape of reporting and rating methodologies. Even though the agencies consolidate over time, managers are significantly concerned over the lack of industry-wide standards in ESG data reporting in reporting and rating quality (Avetisyan & Hockerts, 2017) .

Regulations & standards

"No classification system currently exists at EU level which clarifies what constitutes an environmentally-sustainable economic activity. Market-led initiatives that have emerged in recent years are not comprehensive enough and do not sufficiently reflect all EU environmental sustainability priorities." – European Commission

The European Commission has introduced MiFID II, a sustainability-incorporating revision of the original Markets in Financial Instruments Directive from earlier this century, and a battery of sustainable finance directives installing, among other things, a taxonomy of sustainable economic activity. This combination pushes asset managers and institutional investors to bring ESG data closer to the core of their and their clients' financial decision-making and affairs.

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The benefits of a clear and concise data reporting methodology, which is only one of the foci of this push, are clear. It takes the burden of figuring out what important metrics are off of asset managers and institutional investors and it allows companies all along a value chain to assess each other and exclude any proverbial bad apples, which in turn gives the end consumer the ability to knowledgeably avoid below-threshold products and services.

However, as these initiatives come from a regulating body, they are a bit top-down, and therefore raises the problem of standardization: Who is in control? Who gains from the way this will eventually pan out? Who loses? These are just a few examples of the vivid questions that we ask as this process carries on.

Through interviews, participant observation, and content analysis, interesting angles of the standardization process will become apparent. We aim to create theoretical implications that go beyond sustainable finance.

Policy advice

Outside of egregiously dangerous areas where market participants really stand to lose something in a big way, it is not typically the onus of the policymaker to tamp down volatility in turbulent settings where the standard ways of doing things are not yet established. Like it or not, this is simply a growing pain that sectors need to go through.

The ESG space is one where the overarching goal represents a move away from danger. That is, to establish accountability for the non-financial terms of a firm's affairs, and how this firm contributes to, or compromises environmental, social or governance goals. Thus, our policy advice is one of a lighter hand, and we see opportunity here for policymakers at the governmental level, more than the industrial level, to optimize the sector's navigation.

One issue is that different markets are accreting different standards. Primarily in the scope of FINDER, we look at the division between rating practices and agencies in the North American and European markets. Due to reasons beyond our analysis, these two geographies are pursuing generally convergent interpretations of the overarching goal, yet they seem to remain distinct enough from each other to not interplay very easily. For this reason and likely many others, each geography's capability to exert its own emergent standards and practices on the other goes as far as its ability to engage in *Realpolitik* effectively with the other.

We do not know the extent to which each geography's competent parties practice their work. We only know what our work and that of other scholars, who have spent many years examining complex stakeholder interactions in networked projects, can advise on the process of enlisting and appeasing those stakeholders.

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Ecosystem dynamics: dominance and centrality in innovative ecosystems

– by S. James Ellis, FINDER ESR and Ivo Luijendijk, Industry Director FS&I, Atos

Executive Summary

Cooperation between Fintechs and incumbent financial institutions has become a main – if not the default – innovation strategy for the financial services industry. Pushed by developments in technology (data/digital), society (rise of the digital native generations) and regulations (PSD2/Open Finance, GDPR/Data and privacy protection), banks and insurers needed to rethink the way they handle their client expectations, their workforce and the data they have available. As a result, innovation in isolation is hardly a viable model any longer, yet working with partners causes challenges of its own regarding access to information, business model alignment and the general direction of the change in question. In fact, the central question behind these challenges emerges to be: What are the ecosystem dynamics, in terms of dominance and centrality?

This paper explores this question in three viewpoints, related to three strategies to follow for inclusive innovation in business ecosystems. First is the incumbent viewpoint, which is built around the notion that ownership of the customer relationship determines the dominance in the relationships. This manifests as the customer access strategy. Second is the orchestrator viewpoint, where contribution to the mix of essential resources (data, talent and capital) can shift this dominance. This is linked to the resource focus strategy. Finally, the academic viewpoint explores the desirability of being at the very center of the ecosystem, which allows for more and more meaningful interactions with suppliers and partners. In short, a fringe player (in example one that is less inclined to work with others) runs the risk of having their stunting its growth due to their relative isolation, as compared to more centralized entities. This leads to strategic centrality.

For all three strategies, we conclude this opinion paper with some recommendations on which strategies can best be applied to certain situations, fully appreciating that all three viewpoints can come into play at any business ecosystem at different times of their lifecycles.

In order to test the theory of these viewpoints, the authors have conducted interviews with industry participants from all sides of the ecosystem: incumbent banks, Fintechs and ecosystem orchestrators. The incumbent and orchestrator viewpoints are covered as separate chapters, with the academic viewpoint added as an alternative, fresh take on the question. The Fintech viewpoint was added throughout the paper in the form of quotes from one of our interviews with OakNorth, a neo-bank that successfully progressed in their development in innovation ecosystems as described in this paper.

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Introduction

Award-winning author and business strategist Robert Greene stated± "*An ecosystem that has the maximum amount of diversity is the richest.*". Through this great quote, he puts into words what many have noticed in modern business: true innovation is seldom achieved in isolated effort. Rather, in the current digital environment, the main forces of change are often found in a myriad of companies ranging from major corporations to small start-ups and everything in between. In such a divergent spread of talent, funding and other necessary assets, the ability to work together becomes paramount in order to be successful. But that conclusion raises yet another question: how does such collaboration work? As no relationship can be truly neutral, which participant is dominant and under what circumstances?

This topic (or parts of it) has been explored to some extent in a few previous Atos publications. In the recent Atos Scientific Community publication Journey 2026 ´*Unlocking Virtual Dimensions*[8]´, two chapters explore the inner mechanics of collective and collaborative business models. These chapters, "Business Ecosystem Platforms" and "Moment Centric Markets" explore how ecosystem partners can (or should) cooperate to optimally serve the end client. Exemplary instances of these can be seen in phenomena like coopetition between peers and ownership (where competitors cooperate and compete), interoperability and interlinking of information amongst partners. This view of inclusive innovation is a continuation of the Atos Scientific Community's research for Journey 2024[9] (Redefining Enterprise Purpose), where the chapter "Ubiquitous Knowledge" explores modes of cooperation that support optimal sharing of data among ecosystem partners.

Both publications support the notion that digital ecosystems benefit from the cooperation models outlined above, namely coopetition between peers and ownership, and interoperability and interlinking of information amongst partners. In fact, they assert that siloed digital ecosystems are unable to build true digital transformation, since each data owner or caretaker hoards its treasures — out of fear of missing out on potential future business value that the data could bring. Paradoxically, this actually hampers the creation of added value, because it has been established that more value is actually created by sharing data with partners[10].

Inspired by the visions of these publications, the authors decided to explore in greater detail exactly how partners in a digital ecosystem cooperate and — more specifically — how these relationships are either structured around a dominant player in that ecosystem, or a more round-table approach of equal partners. We recognize that the topic of business ecosystems is a very broad topic, with many angles that offer equal value insights to the inner workings of these business ecosystems.

In this opinion paper, we do not aim to confirm or challenge the many existing academic research already established, but instead offer our experience and insights as practitioners in business ecosystems.

[8] https://atos.net/en/lp/unlocking-virtual-dimensions-report
[9] https://atos.net/en/lp/journey-2024
[10] Chen, Ming-Jer, and Danny Miller. "Reconceptualizing Competitive Dynamics: A Multidimensional Framework." Strategic Management Journal 36, no. 5 (May 1, 2015): 758–75. https://doi.org/10.1002/smj.2245.

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As a case study, the digital innovation ecosystem in financial services was chosen. In a drive for a more seamless payment experience and improved related services, data-sharing regulation[11] has forced the incumbent service providers (banks) to allow third parties (Fintechs) to innovate on top of the existing interbank infrastructure. As such, banks and Fintechs have entered a relationship that can fluctuate between cooperative, parasitic or even symbiotic, depending on who you ask.

We will explore three different viewpoints on ecosystem relationships, which are laid out in chapters 2 through 4, which we then develop into general recommendations for a firm its positioning strategy. The recommendations per chapter relate to firms in certain situations or with certain aspirations, respectively: a firm countering an immediate competitive threat, a firm seeking to cover ground and market capabilities before other ecosystem members do, and a firm in the underdog position -aiming to slingshot upward after a catalyst event. These three profiles could happen in quick or long-term succession, or they may even happen simultaneously. However, elements of each can be interchanged to fit the reader's localized situation.

First, we discuss the viewpoint of an incumbent bank, which focuses on the deciding factor of access to the targeted customers. Next, we introduce the viewpoint of an orchestrator, where the emphasis lies on building the ecosystem partnerships based on availability of scarce resources. We conclude with the academic viewpoint, stating that systematically, establishing network connections with as many ecosystem participants as possible, guarantees insulation from shocks that might wipe out weaker, less connected firms. To further our understanding on the topic, we interviewed personnel from OakNorth, a Fintech company and bank that uses alternative data to provide risk assessments and lending opportunities for medium-sized businesses. OakNorth has experienced first-hand how the relationship between incumbent banks and Fintechs works and what the deciding factors for this cooperation can be. We intersperse excerpts from this interview throughout before adding final thoughts and recommendations in chapter 5, based on the sum of the theoretical and empirical discussion.

Ecosystems explained

In this paper, we explore ecosystems and seek to provide a foundational understanding of potentially ambiguous terms like *ecosystems, dominance, resources* and *scarcity* as we use them hereafter. In support, we offer a comparison between biological and market ecosystems, which we then put into the context of the digital innovation ecosystem of financial services.

[11] https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en

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Ecosystems: Biological context to collaborative digital innovation

Ecosystems are vibrant natural settings populated by diverse collections of different organisms. Over time, these organisms create relationships with each other (or are evolved from relationships) and, as in any situation of resource scarcity, strive to exert resource dominance over competitors. Just as they exist in nature, ecosystems exist among human organizations. The parallel dynamics become particularly interesting among business ecosystems and strategic thinking can be advised by replicating how some of these dynamics occur in the natural world.

To begin with parallels to business ecosystems in general, consider the concept of coexistence among species. For example, figs are exclusively pollinated and used as egg-laying chambers by a highly specialized wasp; they cannot reproduce without the other. Likewise, *highly specialized mutualism* exists between companies that use niche knowledge to construct specialized components of a whole system. In cases such as the Phillips Hue smart lighting system and the collective of developers who created complementary apps that make it usable across a variety of media[12], the system could not proliferate (and therefore survive) without the individual components and the components could not exist without the system.

Of course, other types of coexistence exist. Parasitism, predation and coadaptation can be seen in instances of:

- Companies closely mimicking and profiting off of another company's product design without paying into its R&D;
- Large companies using their capital and influence to "embrace, extend, and extinguish"[13] competitors, sometimes in the process seizing their IPR[14];
- Companies existing peacefully alongside each other while each weathering a disruption in their own, non-competitive ways (co-adaptation).

These examples from the fields of biology and business indicate that within ecosystems some form of dominance or hierarchy is established based on the mutual dependencies and individual interests or strategies of the ecosystem participants.

[12] Hilbolling, S., Berends, H., Deken, F., & Tuertscher, P. (2020). Complementors as connectors: Managing open innovation around digital product platforms. R&D Management, 50(1), 18–30. https://doi.org/10.1111/radm.12371
[13] US Department of Justice. (1999). US v. Microsoft: Proposed Findings of Fact—Revised. https://www.justice.gov/sites/default/files/atr/legacy/2006/06/01/V-A.pdf
[14] Intellectual Property Rights

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An organizational ecosystem is defined as a "*group of interacting firms that depend on each other's activities*"[15]. Companies with horizontal histories typically become entangled in several ecosystems at a time, which can provide potential pathways to lucrative, cross-industry offering portfolios. However, this is a high maintenance *modus operando* that leaves managers without clear answers on where they should focus their strategic energy. In this opinion paper, we will focus on the Fintech ecosystem in order to explore what ecosystem dominance means, what it looks like in an increasingly data-driven world, and how decision makers can adjust their strategies accordingly to seize it.

Fintech: An ever-changing stage

Defining the term "Fintech" is approximately as difficult as delineating the boundaries of the Fintech ecosystem altogether. Where does the population of Fintechs stop, for instance, and the population of insuretechs begin? Bypassing such muddled questions in favor of a portable definition, we use the term in this paper to mean "*an organization using 21st-century technology… to provide, ease, and automate financial… services of any kind.*"[16] The Fintech ecosystem in this paper then, applies to firms that interact non-hierarchically and create interdependencies linked to Fintech ventures' offerings and not to a persistent socio-political structure.

This ecosystem is perhaps most notable for the rapid developments following the implementation of the European Union's Payment Services Directive (PSD 2). The Fintech ventures that sprung up in its wake are captained by inventive minds that have had no problem keeping the ecosystem's pace of innovation at an all-time high. Often, it is the small startups, free from the heavy chains of corporate stakeholders and therefore much more agile than large-scale competitors, that are doing the heavy lifting in terms of breaking technological and innovative barriers. Even more impressive is that this phenomenon exists despite the financial sector's comparatively heavy regulation and scrutiny by external stakeholders that, in other sectors, would preclude the broad existence — not to mention flourishing — of small startups[17].

> "*The thing that Fintechs in particular bring to a partnership with a bank is the ability to innovate, to move fast, to experiment. Some of that is, I think, due to regulation, but I think also some of that is just due to the fact that when an organization gets large, it builds up a kind of internal inertia that prevents it from innovating or makes it challenging to innovate - because large organizations aren't so tolerant of internal disruption.*"
>
> - Sean Hunter, OakNorth

[15] Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. Strategic Management Journal, 39(8), 2255–2276. https://doi.org/10.1002/smj.2904
[16] Ellis, S. J., Völkl, B., & Röttger, J. (2019, October 18). Fintech: Defining a Constantly Evolving Term. The FINDER Project. https://thefinderproject.eu/2019/10/18/Fintech-defining-a-constantly-evolving-term /
[17] Eberhart, R. N., Eesley, C. E., & Eisenhardt, K. M. (2017). Failure is an Option: Institutional Change, Entrepreneurial Risk, and New Firm Growth. Organization Science, 28(1), 93–112. https://doi.org/10.1287/orsc.2017.1110

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Faced with their small-scale competitors' unmatchable speed and subsequently an unpredictable ecosystemic future, legacy banks, insurance providers, and the like run the extreme risk of falling behind and into irrelevancy. However, it is also not enough to simply catch up. While being a technological pioneer is not always ideal in terms of enduring success[18], being towards the leading edge of ecosystem innovation is probably the most advantageous spot for any legacy firm that wants to have a foreseeable future in this digital age.

Likewise, effective innovation does not happen in silos. It is an uninterruptible process that constantly occurs[19] among many different actors and under an impossibly diverse set of terms. Though legacy corporations hold most of the ecosystem's capital and data, they do not hold a majority of its knowledge. Capital and data are useless without knowledge that can competently leverage both. Dominance in any of these categories means control over a significant portion of the ecosystem, which leads to a standoff here between the different parties. Which category is in control?

The Incumbent Viewpoint

Fundamentally, and for this section's purposes, there are direct and indirect players involved in the financial services ecosystem. Direct players are actively involved in day-to-day activities that have measurable effects on the ecosystem, whereas indirect players fall in the former group its sphere of influence. These two types of players interact within their groups, between their groups, and alongside several other factors to leverage scale and customer access as a key control mechanism in the ecosystem.

Let us dive into further detail on direct players, namely Fintechs and financial service providers. Fintechs offer competing alternative technology-based services. For the purposes of this discussion, their key resources are technological and analytical capabilities such as artificial intelligence and algorithms, as well as the ability to provide solutions for niche problems. Financial services providers adopt Fintechs' solutions and occasionally develop their own similar solutions; whether to compete, because of an acquisition, or within a strategic partnership matrix. Their key resources are a broad range of financial products that meet the basic needs of their large customer bases. Fintechs and financial services firms have the common goal of realizing a better, improved product offering and experience for financial services customers.

Indirect players are not as involved in the day-to-day activities of the ecosystem's main drivers, but they are its engine and power-steering: financial services customers and regulators, respectively. Financial services customers are the end users of a solution. These can be individuals or other businesses (in B2C and B2B transactions, respectively) and the adoption curves differ among them. Regulators look to promote competition and innovation with Fintech solutions, while safeguarding the interests of local

[18] Khanagha, S., Ansari, S. (Shaz), Paroutis, S., & Oviedo, L. (2019). Drafting-off a platform ecosystem to create a new one: A study of Cisco and fog computing. DRAFT.
[19] Garud, R., Berends, H., & Tuertscher, P. (2017). Qualitative Approaches for Studying Innovation as Process. In The Routledge Companion to Qualitative Research in Organization Studies. Routledge.

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society and specific customer groups, as well as promoting transparency and prudence among players in the financial services industry.

These players interact within the Fintech ecosystem, which is an area of overlap between the innovation ecosystem and the financial services ecosystem. This overlap is characterized by multiple components. On one hand, an evolution, revolution or constant state of flux, is often initiated by Fintechs, their investors, and increasingly financial services providers. These stakeholders embrace and apply technology to improve processes and products in terms of quality, efficiency and/or costs, which changes business models and improves competitive positioning, among other impacts. On the other hand, one should also consider that the adoption of change is directly and indirectly determined by regulatory constraints and the end customer.

Regulatory constraints imposed on incumbent financial services providers strongly influence the change and strategic calendars of these firms. Regional differences among them do exist, even within the EU. As such, this does not influence the *will* to adopt innovations as much as the ability and capacity to implement innovations within the ecosystem in the context of limited resources.

B2B and B2C end customers are a very heterogeneous group with different adoption patterns when it comes to innovation. End customers are key to both the financial attractiveness and viability of the innovations, since most thrive on scale. However, both Fintechs and financial services providers have a common goal: to help these end customers while using them as a key resource and success factor for financial innovations. With their large market share, financial services firms mostly control this resource, although differences occur across user groups. They use this to shape the cooperation with Fintechs.

Although in a constant state of flux, this ecosystem is moving towards an equilibrium that will be beneficial for most players if they take into account the customers and the regulatory constraints in place to protect them.

In an ideal situation for financial services firms, there is some degree of coexistence and cooperation where they work together — albeit in the form of a partnership or sourcing relationship such as procurement, partial ownership or full ownership. Working together enables financial services firms to spend sufficient time on the mandatory regulatory changes while simultaneously adopting innovations in a timely fashion.

The Orchestrator Viewpoint

The financial services industry has completely changed the way it works for and with their clients. The perfect storm that has come together with regulation (PSD2), demographic change (rise of the millennials), and technology (maturing AI, IoT/Edge, blockchain, etc.) is forcing banks to up their innovation game and reconsider their data strategy.

The key word here is data. Digital banking began in the early 1960s with the rise of the first mainframe computers and the start of automated payment processing. Through its 60-year monopoly on digital

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banking services, the financial services industry has accumulated a vast amount of data on a large segment (if not all) of society. With every digital milestone (in-home banking in the 1980s, online banking in the late 1990s and mobile banking in the 2000s), the adoption of the digital banking services grew[20]. Along with this, the amount of data available for customer analysis grew. But how should banks handle all this data? What can they do with it?

By nature, most banks are slow in innovating and are laggards regarding to adapting to change, and for good reason. Early innovation involves risk, and while risk can lead to financial or reputational damage, these damages could lead to a loss of trust, and a loss of trust could lead to clients moving their hard-earned capital to a different bank. Then, there are overseers who expressly forbid certain innovations for the systemically important banks. Despite all this, banks will need to innovate in order to remain relevant during these times of change. Without leveraging the wealth of financial data at their disposal, facing all the challenges mentioned earlier seems impossible to achieve.

This is where Fintechs come into play. Small, agile organizations that typically focus on niche services without the watchful eye of regulators and public opinion. Fintechs can offer quick financial services innovations with minimal time between conception and market deployment. Their services may be niche, but they will most likely be well developed and easy to adopt.

Their most valuable resource isn't money, since venture capitalists are relatively generous to this field in general. Instead, their most valuable resource is talent. The ideas and technological skills that their personnel offer is essential to them, much more than they are to large companies with star power. However, because Fintechs lack brand awareness and reputation, they must aggressively hunt for clients and exposure, as well as ensuring to meet all regulatory compliance requirements.

Of course, banks have another point of view. They offer large stores of data about their clients and account holders, as well as money and pre-existing compliance as major resources to barter with. Without the unique sets of client data, any Fintech would find it difficult to build any appeal for their services, no matter how advanced their technology is. Additionally, banks have significant experience in ecosystem innovation to offer. The *coopetition* business model[21] is a long-standing tradition enabling banks to tackle the regulatory-driven innovation (SEPA, PSD2, eIDAS, real-time payments, etc.) that has dominated their change agendas for the last decade or so.

Because they have a reputation to uphold and stakeholders to satisfy, banks must safeguard their assets and carefully select the right partners and the methods for finding them. The ecosystem of Fintechs can be overwhelming both in size and volatility, which has given rise to orchestrator functions (like the Atos Fintech Engagement Program[22]) and Fintech hubs (like TechQuartier[23] in Frankfurt, Germany).

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[20] Barnes, S.J.; Corbitt, B. (2003) Mobile Banking: Concept and Potential, International Journal of Mobile Communications, vol.1, pp.273-288

[21] Bengtson, M; Kock, S. (2000) "Coopetition in Business Networks – to Cooperate and Compete Simultaneously. Industrial Marketing Management, 29(5), 411-42. https://www.sciencedirect.com/science/article/pii/S001985019900067X

[22] https://atos.net/Fintech/home

[23] https://techquartier.com/

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These quick profiles show the very different natures of these ecosystem partners. Banks are financially stable, enjoy lifelong relationships with their clients, and are relatively slow to change. Fintechs, on the other hand, are organizationally agile and focused on applying emerging tech to bring new levels of service to their clients. As a result, the three major resources that this digital innovation ecosystem competes for (data, talent and capital) are shared unequally between both partners, which gives rise to the question of ecosystem dominance. Who needs the other its resources more?

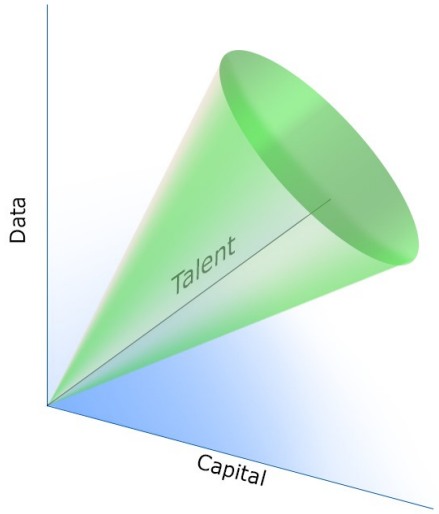

Figure 1. The cone of optimum firm resource balance between data, talent and capital.

The three main resources at play in the relationship between Fintechs and banks are data, talent and capital.In this context, data represents the available information about individual account holders as potential customers for both banks and Fintechs. This data includes not just financial information, but also knowledge about their income, spending habits, interests and activities. Talent stands for the availability of trained workers with the technological and business skills required to build digital innovations. This includes data scientists, blockchain developers, customer experience specialists and others. Finally, capital is the funding required to build, market and maintain these digital services.

The three-dimensional space between these resources depicts how the resources are spread between partners in any given relationship. The cone illustrated in Figure 1 shows the ideal equal spread and availability of the resources, which forms the sweet spot where there is no limiting factor in the relationship, thereby allowing for an effective partnership. This model can help banks and Fintechs alike, as they attempt to identify the right partners to supply whatever resource is currently lacking to effectively build digital innovation.

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Reflections on Dominance

Due to the longstanding order of things, dominance logically favors banks due to their size and market position. Resource competition can change that. If the availability of talent overtakes money or customer access as the most valuable resource, perhaps Fintechs will gain an advantage over banks. Money is usually not a differentiator either way. Banks typically have sufficient funds, whereas Fintechs tend to attract investors that fill this need. However, because banks can also act as investors, banks can reaffirm their potential dominance over this axis as well.

An interesting parallel is dominance within banking associations. Big banks often dictate the *modus operandi* for all banks, mostly because smaller banks are happy to take a back seat and wait to see how the big players handle the challenge at hand before choosing their own strategy. How then does this play out with Fintechs?

As central players, the dominance in this relationship is difficult to assess, especially if a middleman is introduced like system integrators (on behalf of the bank) or Fintech hubs (on behalf of the Fintech). These parties may (or will) introduce additional factors into the relationship in the form of partner preferences or bundled offerings.

> *"There's definitely a disparity of economic power… the bank is much larger and they're writing the checks. but I think that that's not necessarily a bad relationship for the Fintech either, because you've got a captive customer who really wants you to succeed… assuming you have a customer-one relationship. As a Fintech, that's incredibly valuable because… they're going to give you direct access to the right stakeholders… they're going to try to hold your hand and help you when things go wrong, they're going to give you direct, honest feedback about your product. All those things are incalculably invaluable for a startup company."*

- Sean Hunter, OakNorth

The Academic Viewpoint

Control over a market population, as far as it is required to dominate or exert dominance over any subset of that population, is a tricky thing to obtain. Does holding a critical share of the ecosystem's valuable resources (such as data or, more importantly, access to data) equal control, or is it simply a means to control?

The same question applies to any instance where a firm seeks to pull institutional levers in its favor, such as influencing high-level decisions made by regulatory bodies or campaigning to become a primary organizer of some powerful industrial association. These are effective ways to adjust the constraints that all ecosystem participants must abide by, but do they mean the firm in question is dominant among its peers? To answer this question, we must look beyond the definition of dominance as an organization's ability to exert its own will on others. Rather, we suggest that for a firm to be truly dominant, it also needs

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robust insulation from ecosystem shocks that periodically and necessarily wipe out ecosystem participants. In other words, defense is just as important as offense.

Moment-centric markets, or MCMs[24], are a suitable example of this concept. A moment-centric market is an emerging concept of economic operation, wherein supply chains of goods create and add value to those goods if and only if there is a current market demand for them. The MCM concept stands in opposition to current models, where resources are refined and goods are manufactured at rates determined by the supply end of the chain. The current system is attractive because it does not require as much expensive infrastructure oversight, but also creates wasteful surpluses and consequentially, disproportionate environmental degradation.

Consider this: If MCMs were born of necessity (such as constraint-driven supply chain streamlining or societal pressure to create ethical value chains), establishing redundant partnerships to establish a central position in the ecosystem is a low-cost way for firms to preemptively mitigate unforeseeable shocks such as the next COVID-19 or a catastrophic failure of the orbital satellite network[25].

However, an important corollary is that through the process of periodic shocks and recoveries — or "booms and busts" to borrow from Keynesian economics — the center point of any given ecosystem will shift over time, and the firm at that focal point must move accordingly.

To explain what we mean, let's look at an analog from a natural ecosystem before getting to the technical explanation of how to do it. Consider the polar bear, the dominant species of the polar ice cap. While polar bears occasionally prey on other mammals, birds and fish, their primary prey are blubbery, calorically dense seals, which they hunt by stalking the breathing holes they make in surface ice or by ambushing them as they rest atop the ice. These stalking and ambushing skills must be maintained, and time spent hunting other prey (which requires different skillsets) is time not spent honing seal-hunting skills. During booms, where habitats are static and the ecosystem is flush with nutrients that allow the seals to fatten and reproduce, the polar bear (which represents a dominant firm) will likely focus only on hunting seals as a means to survive. They are calorie- and nutrient-rich and it might not make sense for them to focus on less dense prey in such times.

However, during ecosystem busts when nutrients are scarce or climate disruption melts the ice upon which they hunt, polar bears are forced to rely on other animals as prey. Seals are more agile in water and therefore much more difficult for bears to hunt. If the polar bears did not have the skills required to hunt birds and fish, they would be at extreme risk of being starved out of the ecosystem during busts.

While the environmental disaster happening at our polar ice caps is an urgent issue that we cannot ignore, at least in this opinion paper we can take solace that — in business ecosystems — these decisions are not typically a matter of life or death. Yet, the risks are the same. Centralizing partnerships on only a

[24] As described in Journey 2026: Unlocking Virtual Dimensions

[25] An often overlooked but increasingly likely scenario that will have devastating, far-reaching consequences on global maritime and air shipping and travel as well as aerospace and defense. For more, see https://www.orbitaldebris.jsc.nasa.gov/remediation/

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few necessary ecosystem contacts puts a business at unnecessary risk that can be easily mitigated by establishing redundant partnerships, even if they remain dormant until an emergency arises.

This defensive focus has a surprising benefit that becomes apparent over time:

> *"I think there's definitely a philosophical difference between people who are looking to increase their size of the pie versus people who are trying to sort of grow the pie for everyone… I think growing the pie as a [small company] has to be your focus, trying to make things better for your direct customer and also for their end customer. For us, for example, if we go to a customer and they say 'hey we need a CRM system,' I go 'hey, I'll introduce you to our contacts at Salesforce, we know that they can get you sorted out.' I get dollar zero from that obviously, but in actual practice, my motivation entirely is to make the whole package work for the customer, because if I do that, then we are an integral part of an ecosystem that works well for them and is successful and ultimately we're going to be successful that way*."
>
> - Sean Hunter, OakNorth

Our argument here is not so lofty as to assert that individual companies should be concerned with making the ecosystems in which they operate more egalitarian; we mention that only as a beneficial side effect. Still, just as in socioeconomic development studies, there is philosophical merit backed by clear evidence[26] that *in business ecosystems, dense networks of collaborative ties have a positive effect on the health and wealth of the entire ecosystem*.

Perhaps most importantly, if the focal firm finds a way to position its narrative as being the ecosystem's pioneer of altruism, positive assessments of the firm's contributions will yield significant soft power benefits down the line.

This does not say that every ecosystem participant will follow a linear trajectory of growth, nor that every firm in the ecosystem will survive. Business leaders, analysts and researchers understand almost as well as ecologists that the death of some ecosystem participants is necessary for the good of the entire ecosystem. It is, however, this very death that systematic centralization aims to prevent.

Strategically Centralizing

Centrality is distinctly agnostic of resource ownership or authorship of industry standards. Here it simply means having a dense series of connections to other densely connected entities within the ecosystem.

[26] E..g. Chen, M.-J., & Miller, D. (2015). Reconceptualizing competitive dynamics: A multidimensional framework. Strategic Management Journal, 36(5), 758–775. https://doi.org/10.1002/smj.2245

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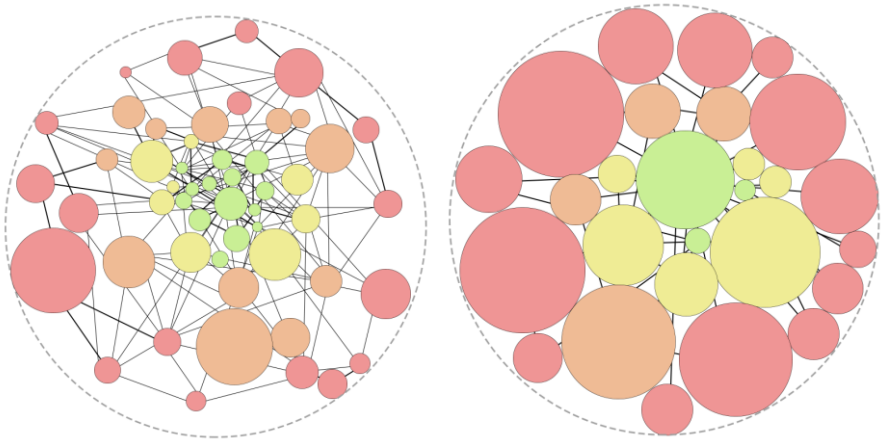

Figure 2. An ecosystem map over time, where highly connected firms centralize and loosely connected firms get pushed outwards.

Figure 2 represents a hypothetical emergent ecosystem over time. On the left is a sparsely populated ecosystem, the inhabitants of which are small, perhaps new companies with comparatively little market strength. On the right is that same ecosystem after it has matured and captured more of its local market share. Some of the initial entrants depart the ecosystem or fail. In any case, their gaps are filled in by extant or new ecosystem members that mature and form new bonds over time.

As firm boundaries move closer and closer together, so do their connections with supply and production partners. However, fringe members (shaded in red) see a proportional relationship between their growth in the market and their level of dependence on comparatively few market partners.

In other words, *if fringe companies stay at the fringe, their growth becomes a liability, as the survival of their now-larger business becomes reliant on individual relationships*, which are potential single points of failure. This is unwise strategic positioning, of course, and the more favorable angle is that of the centralized companies (shaded in green).

These companies are insulated from their own failure despite the potential failure of complementary firms in the ecosystem, due to the backup and redundant supply and production partnerships they have formed. You can see this in other ecosystems and ask yourself a simple hypothetical question to test the veracity of this argument: Which is more likely to fail: *Toyota, or one of its many parts suppliers?*[27]

Another key benefit to strategically centralizing the firm is the ability to leverage network effects to broker and orchestrate connections among these entities.

Suppose Company A requires Component Θ for a new, experimental go-to-market offering. It could very well manufacture Component Θ itself, but if this is not within its range of existing competencies, spinning

[27] Aoki, Katsuki, and Miriam Wilhelm. "The Role of Ambidexterity in Managing Buyer–Supplier Relationships: The Toyota Case." Organization Science 28, no. 6 (December 2017): 1080–97. https://doi.org/10.1287/orsc.2017.1156.

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up the R&D will take more time than outsourcing half of the production to Company B and half to Company C (companies with the competencies to produce instantly). This way, Company A can still protect its IP by disaggregating and possibly encrypting its production, and it is also enlisting two other firms as stakeholders now invested in Company A's success. Getting to or achieving this position may not come with grandeur and flair. Instead, it likely involves overwhelming conformity to ecosystem norms while eking out a modest, yet optimal firm distinctiveness[28].

Of course, the digital nature of a data-based ecosystem effectively eliminates geographic limitations on achieving this position in most cases. Geography is a factor to consider in cross-firm partnerships, but close is not always best[29]. Additionally, regulatory steps such as PSD2 are intended to make previously elusive datasets more widely available — to the point where fringe members of an ecosystem could, in many ways, leverage proximal data stores with significant success.

Conclusion and Recommendations

In summary, this opinion paper concerns positioning strategies that business leaders can deploy in ecosystems to secure an advantageous dominance among their peers. While our arguments are primarily geared towards businesses whose activities take place in existing ecosystems, it is also worth mentioning that ecosystems can certainly be created around almost any product or service with multiple moving parts. In advanced cases where business leaders form ecosystems around their products or services, the benefits of our strategies are compounded by the architect's advantage. Examples of this include Ingenico's open development environment[30] for building third-party apps that can enrich the payment experience for both the shop and shopper. Though the app builder certainly benefits from the use of its app, Ingenico arguably benefits most through the growing appeal of its product.

Each strategy boils down to leveraging a focus. In the first strategy, which we label **customer access**, focus is on who brings the most relevant access to a customer base, which a focal firm can disintermediate and subsequently leverage to create its own value-added services. The primary difficulty faced by firms employing this strategy is that the consumer is an indirect market participant and, in that sense, is not as invested in the market as the direct players — like financial services providers and Fintechs. Thus, the business leader pursuing this strategy must devote considerably more time and energy on a largely disinterested market body to achieve ecosystem dominance, which is related to the concept of customer centricity. However, this focus views the turbulence of ecosystem disruption (such as in the wake of a game-changing technological innovation) as momentary, and ecosystem equilibrium as the end goal. Therefore, if we consider ecosystems to be in constant flux with intermediate periods of

[28] Zhao, E. Y., Fisher, G., Lounsbury, M., & Miller, D. (2017). Optimal distinctiveness: Broadening the interface between institutional theory and strategic management. Strategic Management Journal, 38(1), 93–113. https://doi.org/10.1002/smj.2589
[29] Ben Letaifa, S., & Rabeau, Y. (2013). Too close to collaborate? How geographic proximity could impede entrepreneurship and innovation. Strategic Thinking in Marketing, 66(10), 2071–2078. https://doi.org/10.1016/j.jbusres.2013.02.033
[30] https://developer.ingenico.com/

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stability, we surmise that *this strategy is best suited as a near- to mid-term tool for business leaders needing to react to and overcome some kind of threatening externality such as an encroaching competitor*.

Our second strategy, called **resource focus**, begins with an emphasis on data, talent and capital as distinct but interrelated and interoperable resources. While this focus emphasizes the importance of *having* these resources, we would argue that *striking a strategic balance* between these resources is more crucial for incumbent firms to establish leading positions within an emergent ecosystem. To clarify, this does not refer to the total assets held by a firm, but only those that it dedicates to ecosystem development activities. Thus, this focus suggests that if a firm successfully secures X amount of internal funding to begin deploying its strategy, the strategy must also make up for the proportionate differences in missing talent and data. As such, an orchestrator can reach its innovation ambition by bringing partners into the ecosystem to fill the existing resource gaps. The wealth of funding opportunities available for smaller Fintechs demonstrates that capital is no longer the sole resource that firms require to rise to the top of their ecosystems. Firms flush with data and talent must similarly find funding to further develop and scale their services, likewise with the other permutations of this triad of resources. One point of attention here is that a resource focus will often be the result of an internal ambition, rather than a more dynamic co-innovation situation. As such, resource focus is often applied to execute on a plan. At the core of this strategy is the idea that *these differences can be compensated for by strategic partnerships with other firms, making this an internally-focused strategy for firms seeking to explore available or emerging market gaps in their immediate vicinity*.

The third and last strategy, called **strategic centrality**, is defensive in nature and agnostic of the material or circumstantial assets of the firm. It argues that, regardless of size or stage, a firm can methodically establish more and more partnerships in its ecosystem. After enough of this work is completed — which can be as simple as a handshake or as complex as integrating a partner's services into your portfolio — the firm will have inextricably linked itself to nearly every other player in the ecosystem. Granted, such a strategy requires a strong commitment and constant upkeep of the network, but beyond the simple benefits of networking, businesses that deftly maneuver in this way will find themselves bound to other strong players in the ecosystem and thus insulated from ecosystem shocks that wipe out weaker, less interconnected participants. When mapped as we have in Figure 2, this scenario may look like the bunching up defensive behavior that animal herds deploy when fending off predators. However, the key idea about dominance is that weathering difficult times is just as important for ecosystem members as it is to be punchy and innovative during easy times. Thus, *we recommend this strategy for businesses that are not presently positioned to overtake competitors in the near-term, but that also forecast a set of circumstances in the near- to mid-term that might drastically change the competitive landscape and open opportunities for them to emerge on top*.

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Strategy	Focus	Key Drivers	Points of Attention
Customer Access	Access to (potential) customers, direct participant in their day-to-day economic activity	Ecosystem equilibrium, handling temporary intrusions	Requires more energy and attention to get the indirect participants (customers) invested
Resource Focus	Orchestrate a balanced availability of resources: data, talent, capital across the innovation ecosystem	Exploring available or emerging market gaps	Internal focus on a pre-defined innovation
Centrality Strategy	Central and well-connected position in the ecosystem	Preparing to benefit from changing circumstances	Very labor-intensive, requires constant attention

Table 1: summary of the ecosystem dominance strategies

In conclusion, we want to make clear that none of these strategies are mutually exclusive. It is generally understood that the winning arsenal for business leaders consists of adaptive combinations of strategies that change according to what is presently available, what is presently concerning, and what is presently demanded of them by their stakeholders. Consider the recommendations we have made for each strategy: a firm countering an immediate competitive threat; a firm seeking to cover ground and market capabilities before other ecosystem members do; and a firm in the underdog position, aiming to slingshot upward after a catalyst event. These three profiles could happen in quick or long-term succession, or they may even happen simultaneously and to different arms of a single company.

What emerges as most important for business leaders is to make a sober analysis of their firm's position minus the high-gloss varnish and pumped-up self-appraisals that managers often find themselves surrounded by. They must be acutely aware of what awaits them in the near-term future and prepare accordingly, with the innovation ecosystem of their choosing.

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Orchestration: Dynamic Control from the Panopticon

– by S. James Ellis, FINDER ESR –

Business ecosystems are distinct from random collections of companies for the high degree of interactivity between ecosystem participants. In a purely ecological sense, this is the difference between a random collection of penguins, chimpanzees, and grizzly bears in a zoo – who have little if any interaction with each other for being confined to separate enclosures and having no natural connection otherwise – and a collection of lesser long-nosed bats and the night-blooming cacti of the Sonoran Desert. In these more interesting cases, interactivity is beneficial to at least one party and ideally beneficial – but perhaps inert or even damaging – to the other. In the case of the bat and cactus, the relationship might even be a matter of survival.

Businesswise, we see this in, for instance, the smart lighting industry. Providers of smart lighting platforms provide the lights and a basic infrastructure for third parties to provide add-on services. Those complementors then come in and jazz up an otherwise mundane chandelier with services like music synchronization to make the entire ecosystem – platform, complementors, and all – more attractive to customers. Scale these systems up from individual users to smart lighting systems for entire cities, and the potential for ecosystem diversity becomes immense.

However, unreigned chaos – in the constructive rather than destructive sense – rarely provides efficient market outcomes. In the smart lighting example, platform providers have some sort of de facto control over the ecosystem of complementors that amass around their platforms, and they might use this to nudge certain outcomes. This is not always the case. Especially when the "platform" around which complementors come together is more conceptual rather than a tangible product, the roles of who provides the platform and who really guides where it's going become disentangled. In these settings, a strategically advantageous position to take is that of an orchestrator, which involves putting one's self or firm in the center of many others and attempting to order and interlace those others' capabilities and offerings.

This either requires or hopefully provides a panoptical view of the ecosystem, which can then be harnessed to create things of value. Information asymmetry, which I won't get into, and intentional ambiguity, which I will, can affect what one can do from that panopticon, but in this post, I'll first discuss orchestration generally as a concept before getting into some literature that addresses the challenges that can burden the orchestrator. Don't worry though: I'll also get to some strategic fixes and recommendations to get around those, which will likely become more useful over time as we see ecosystem cooperation – and thus orchestration – rise in importance.

The panopticon is a dynamic literary symbol, i.e. commenting on cultures of surveillance and the vulnerability of those surveilled. Ideally, this post will strike a more positive tone. Artwork created by and used with permission from Adam Simpson.

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Defining an Orchestrator

Rarely are business leaders and their stakeholders – employees concerned with career growth, investors looking for substantial returns, and so on – content with being in the passenger seat while unplanned chaos drives. Ecosystems, despite their difficulty to gain unilateral control of, are steerable. They can be steered by the institutions that oversee them from the beginning – such as regulatory authorities providing tax incentives for companies working towards certain Sustainable Development Goals – or they can be steered by actors within the ecosystem – such as firms attempting to establish themselves as industry leaders by enlisting other ecosystem actors to work towards a collaborative, groundbreaking innovation.

An orchestrator, to borrow and slightly adjust the oft-cited definition of Dhanaraj and Parkhe, are central firms that create value by ordering components of an ecosystem into sequences more valuable than the sum of their parts, and then extract value by selling those sequences as products or services (Dhanaraj & Parkhe, 2006). That this is exactly what happens in a professional orchestra is an obvious statement, but also one I've not seen anywhere in all this literature, so there it finally is.

Over the past five years or so, Atos as an orchestrator amid the financial services ecosystem worked to create a system whereby they search for promising Fintechs, daisy-chain those Fintechs' offerings alongside those of other Fintechs as well as the ones Atos itself can provide, then sell those solutions to clients. The benefits are clear in this win-win-win situation: Fintechs (those being orchestrated) gain market exposure especially to large clients, clients (those for whom the orchestrator is orchestrating) are able to purchase their innovation goals, and Atos (the orchestrator) draws in revenue as the broker of the deal with minimal costs in terms of production.

Orchestration as a theoretical event is not necessarily a new concept. The previously cited Dhanaraj and Parkhe article, which seems to be the root article in a lot of management literature concerning the topic, was published in 2006. It's been a long time since then, with 2020 accounting for roughly half of it.

However, one of my colleagues right here at Radboud University co-authored an article on orchestration that was published in Organization Studies this year, and the insights are particularly valuable for practitioners in likely any industry who seek to achieve a similar role. The above win-win-win dynamic, after all, is about more than generating profit for shareholders: it's about improving the health of the ecosystem. Whether in an ecological or a market sense of ecosystems, it's hard to argue against that. We also reference an article co-authored by a partner of the FINDER project, Dr. Miriam Wilhelm, which relates in its discussion of how a central firm must apply different approaches and more specifically ambidextrous ones when dealing with other firms contributing to its outputs (Aoki & Wilhelm, 2017).

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The difficulty of constantly being in tune with all orchestrated components – being in the panopticon – is no small factor, and it not only requires many sets of eyes to monitor what's going on in many places at once, but it also involves many sets of hands to address various issues and concerns among the various project participants. Even more importantly, it requires an intuition for when to apply hands-on, dominant solutions and when to only provide a gentle nudge before letting the consensus figure out the rest.

Two Modes

Broadly speaking, the study focuses on interfirm orchestration. This is in contrast to orchestration that occurs between different units within a firm, which we'll cover in a future post. In their paper, Reypens, Lieven, and Blazevic assess a project with a large collection of stakeholders to explore how orchestrators go about mobilizing agents in a variety of firms to work towards the same objective. They adopt the view from previous literature that there are two modes of orchestration: dominant and consensus-based. These are fairly self-explanatory: in the former, one entity attempts to centrally govern most processes that happen within the endeavor, putting other entities in a *de facto* subordinate role. In the latter, governance and management are decentralized or revolving. The authors then assert that both of these modes can be employed in a given project and by a given entity dynamically.

It is along this line of thought that they commence their analysis, and their study lays out in great detail the dynamics that occurred between stakeholders through a four-year project. Specifically, they narrate how orchestrators of the project danced between dominant and consensus-based orchestration based on environmental conditions, the growing capabilities and interaction of the network participants, and so on. The paper – cited in full at the bottom – contains insights that would likely be useful for any manager at the head of a collaborative project, and thus is worth a fuller read. We'll use the remainder of this piece to discuss how key aspects of their abstraction can turn into specific strategic methods for practitioners. In the following section, we'll refer to orchestrated projects, but keep in mind that this can be scaled up to long-term, international events or scaled down to embedded units within a single company.

Strategic Recommendations

This section briefly extracts a few points that are practically relevant for managers finding themselves at the beginning of or in the midst of populated projects. The authors also included a chart in their work for this, which we've included below, that discusses specific orchestration practices that address the plurality as well as the diversity of stakeholders – again, the paper is worth a look for a more comprehensive explanation.

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Table 2. How dominating and consensus-based orchestration help orchestrators address distinct network challenges brought by the number and diversity of stakeholders.

	Number of stakeholders	Diversity of stakeholders
Dominating orchestration	*Practices to overcome network opacity*	*Practices to create a shared representation of the project*
	Developing project proposal	Formulating project vision
	Assigning roles	Showcasing project
	Stimulating initial encounters	Showcasing results
	Bridging stakeholders	
Consensus-based orchestration	*Practices to address collective action problems*	*Practices to increase legitimacy*
	Motivating key contributors	Discussing differences and raising awareness
	Creating smaller teams	Providing flexibility
	Monitoring progress	Stimulating bottom-up collaboration
		Facilitating relationships

The original table can be found in the paper co-authored by our Radboud colleague, Dr. Vera Blazevic: Reypens, C., Lievens, A., & Blazevic, V. (2019). Hybrid Orchestration in Multi-stakeholder Innovation Networks: Practices of mobilizing multiple, diverse stakeholders across organizational boundaries. Organization Studies, 42(1), 61–83. https://doi.org/10.1177/0170840619868268

To start, I'm going to momentarily reach out to a different theoretical topic before coming back to this topic. You might've heard the team "ambidexterity" in contexts *not* referring to what people can do with their hands lately; as a theoretical topic, it's a contemporary darling in management literature and not for no reason. At its core, it refers to the basic idea of doing two different things (well) at once. In this paper, the authors suggest that orchestrating dominantly and orchestrating harmoniously must be dynamically balanced over time to account for stakeholder diversity. The link between these concepts is clear, but we can make it clearer if we compress the four-year period they researched the medical project of their focus into one event1. As such, these occur ambidextrously and through three episodes the authors define: connecting members, facilitating their work, and governing the process.

To tie this in with the article co-authored by Dr. Wilhelm, the orchestrator should make it a goal from the beginning to gain a comprehensive understanding of each orchestrated member's own capabilities and how motivated they are of their own accord to accelerate or modify those capabilities (Aoki & Wilhelm, 2017). While a complex task to pull off, it can really pay dividends: having an in-depth knowledge of how certain, KPI-driven members respond to ambiguous versus very specific task guidance sounds intuitive but is also overlooked to a disappointing extent. Consider, if nothing else, how this knowledge might be used to motivate those members to optimize their own processes without repetitive external pressure (from the orchestrator).

To borrow an example from the above-cited paper, Toyota sought cost-reduction behaviors from its supply network partners. However, Toyota was also interested in maintaining the quality of parts

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delivered. While on one hand demarcating clear, measurable cost-reduction goals to all of its suppliers, Toyota on the other hand offered coaching in the production-optimization practice of *kaizen* to individual suppliers without explicitly forcing them to follow it or micromanaging how those suppliers optimize their practices *(Aoki & Wilhelm, 2017).* This lateral freedom allows those suppliers to explore their own potential for improvement, and giving that to members of an orchestration project at every ripe opportunity is a key strategy that managers should keep at the top of their toolboxes.

For business leaders finding themselves near the starting line of projects that resonate so far, the connection step is important. Especially as the ongoing COVID-19 pandemic has largely scattered the workforce out of centralized working locations such as corporate offices or construction jobsites, bringing members back together is necessary to prevent a situation where project members feel like they're disconnected from their peers. In a material sense, this can have resounding consequences for the serendipitous generation of new ideas that could make a good project even greater. It's advisable, however, to mitigate effects such as "Zoom fatigue" (a review of that linked article being a good first step).

Shifting tracks slightly from connection of members to facilitation of their work, being a present and connected orchestrator goes a long way. "Work" of course means different things in different arenas, but I focus here on the type of work where various members of a larger project have relative freedom in the ways in which they go about performing their tasks. In other words, they're able to deliberate, think of alternative methods, and perhaps implement them even if it slightly shifts the course of the entire project. This stands in contrast to, for instance, assembly line work, where workers (be they human or machine) perform highly specialized tasks without much room for on-the-spot improvisation.

Members of an orchestrated project – especially due to the tendency for these workers to get into states where their field of vision narrows to what they and only the direct links in the project's system are concerned with on a daily basis – might find themselves hitting the proverbial "writer's block," or perhaps straying away from original objectives. Especially when given ambiguous guidance per the earlier recommendation, this is likely in large projects with a diversity of stakeholders. Orchestrators, however, have an extremely valuable bird's-eye view of the project even when it might seem chaotically dense. How can they leverage this to refuel, restart, and realign their agents? By making the objectives and especially the interdependencies of other components in the project chain known to straying or stalled participants, giving them a reference point to guide their own way forward.

The nexus of this paper, and the final point we'll discuss here despite there being much more that's worth a look in the paper itself, is in discussing the orchestration mode as dynamic through time. Sounds intuitive, doesn't it? But considering the reasons why that might need an entire research paper to cover alludes to the instinctive and perhaps counterproductive nature of projects with too many cooks in the kitchen, so to speak.

The project they researched showed that orchestration moved from dominating to consensus-based because "as ambiguity decreases and relationships form, the reliance on formal structures decreases." It's not difficult to imagine why this crucial step goes missed in, for example, old-school dinosaur

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companies that have opted for a community-based innovation approach in trying to leapfrog past their advancing competitors. Relinquishing control, even if for the health of the initiative itself, is a difficult thing to do for high-level managers in these companies who might perceive doing so as jeopardizing their professional reputation.

Policy recommendations:

During the course of the FINDER project, we came in contact with policies that stoked the catalyzing aspects of multi-stakeholder orchestrations while quelling the roadblocks that normally obstruct them. Abstracting from those and generalizing from the individual cases we assessed, we can recommend a few policy instruments best suited for regional governments and more local policymaking bodies, including industry associations.

Firstly, it is important that stakeholders can find each other in time and space. Regional and local policymakers can create conditions where industry consortia can effectively attract talent and resources from a wide area and range of competencies. One way they could do this is, of course, through grants and fully subsidizing the hire of dedicated community & stakeholder managers for these state-endorsed projects, thus taking many of the social and societal burdens of orchestration off of the coordinating organization.

Perhaps more difficult to engineer but certainly more effective would be incentivizing participation in these arrangements through specially tailored tax breaks, afforded to companies orchestrating scientific or commercial projects involving many different organizations. The justification for this would be that the potential economic returns, both short- and long-term, of a successful collaboration and all of the ensuing, permanent partnerships it fosters will likely return multiples of the original investment. Yet, we abstain from specifying further than this, because the specific method and motivations behind how this would be implemented are highly contextual.

The original paper co-authored by our Radboud colleague, Dr. Vera Blazevic:

Reypens, C., Lievens, A., & Blazevic, V. (2019). Hybrid Orchestration in Multi-stakeholder Innovation Networks: Practices of mobilizing multiple, diverse stakeholders across organizational boundaries. Organization Studies, 42(1), 61–83. https://doi.org/10.1177/0170840619868268

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The paper co-authored by Dr. Miriam Wilhelm, a member of the broader FINDER team:

Aoki, K., & Wilhelm, M. (2017). The Role of Ambidexterity in Managing Buyer–Supplier Relationships: The Toyota Case. Organization Science, 28(6), 1080–1097. https://doi.org/10.1287/orsc.2017.1156

1. *"Why would you do that though?" Good question. In process research methods, and more specifically in researching Markov processes (which I do not claim to be an expert about, so take the following with a grain of salt), occurrences (such as the collaborative writing of one work package that is a small component of a larger project) stack into events (such as the combination, assignment, and fulfillment of these work packages to achieve project outcomes); events then stack into states (such as the project shifting from incomplete to complete). This is not absolute, but rather a good framework through which one can comprehend how long-term processes can be systematically divided up for incremental analysis.*

2. *Kaizen, per Dr. Katsuki Aoki (the co-author of Dr. Wilhelm's paper), is "a term generally and broadly used in Japanese manufacturing industries to refer to activity that is implemented onsite by recognizing and bridging the gap between ideal and actual conditions and applying ideas to improve a production situation."*

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The digital business ecosystem Gaia-X

– by Jonas Geisen, FINDER ESR –

Atos and the FINDER team hosted an online event week on Inclusive Digital Innovation in Financial Services & Insurance from the 15th until the 18th of March, 2021. As the COVID-19 pandemic has been a catalyst for digital adoption across various aspects of our private and professional life, simultaneously in the financial services and insurance industry, processes were – and still are – increasingly tackled by leveraging data, machine-learning, and Fintechs/InsurTechs. Atos has joined forces with practitioners, academics, and policy-makers to discuss how to yield benefits from these developments by repositioning banks in the ecosystem, using Artificial Intelligence in insurance, mitigating risks in new venture collaborations and exploring the opportunities of the European Gaia-X project.

During one of the sessions of the Inclusive Digital Innovation in Financial Services & Insurance (FSI) event, we had a look at a European moon-shot project Gaia-X. For this topic we were happy to welcome Hubert Tardieu, chairman of the Board of Gaia-X AISBL, highlighting how the project will shape the future of the financial services and insurance market in Europe by *"creating a next generation data ecosystem for Europe with a global aspiration".*

The kick-off summit of Gaia-X in 2020 consequentially focused on two major foundations for a project of such scale. First, the overall key concepts to achieve the envisioned cloud penetration of and in the European market were presented. These depict the five pillars of the project:

1) Supporting policy rules derived from requirements of a European single market
2) Support federal data infrastructures (methodology to synthesize different frameworks)
3) Ensuring interoperability, sovereignty, portability of data
4) Providing testable compliance to Gaia-X Architecture of standards
5) Acknowledging open standard setting processes laid out in the internal Gaia-X rules

Second, the project's governance structure was outlined. Both points reveal what is at the heart of the project: creating a digital business ecosystem for open innovation.

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Gaia-X – digital business ecosystem by design

Extant literature highlights a couple of design principles to achieve a successful setup of a healthy digital business ecosystem(Adner, 2017; Boley & Chang, 2007; Tan, Ondrus, Tan, & Oh, 2020). The summit therefore was existential to growing legitimacy by presenting that Gaia-X is shaping its governance based on these, interdependent, principles:

- Demand orientation; stating a mission allows enthusiastic actors to push into the ecosystem instead of pulling them in securing pro-active, responsive behavior for the joint value creation.
- Openness; in form of a transparent environment enabling an easy access.
- Self-organization; enabling participants to act autonomously to increase commitment.
- Loose coupling; so that participants can join freely and engage in open relationships so that there are no heavy dependencies determining the success of conducted projects.
- Domain clustering; enabling the grouping of participants in projects based on shared interests.

Advantages of Gaia-X as a digital business ecosystem

Mr. Tardieu sees a major benefit of Gaia-X in enabling Europe-wide collaboration between the private and public sector. First, the initiative allows to jumpstart the facilitation of digital competence of European companies and thereby Europe's economic abilities. Second, it enables European-centered research intersecting with practitioners which in return enables more precise policy-making. Third, the collaboration allows for a holistic approach addressing all necessary elements to facilitate digital services together from root-to-tip. The initiative captures the alignment of technical standards and services for interoperability and portability (the roots) through the federated trust and sovereignty services (trunk) up to the definition of ontologies, APIs and technology standards for compliance (leaves).

"Gaia-X may seem gigantic but we don't think that the big issues we are trying to tackle can be 'sliced' into smaller parts. In Financial Services and Insurance, this is especially true at a time when cloud adoption needs to accelerate and there is so much change within the industry."

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Based on these the concept of open strategy, nested in a digital business ecosystem, offers advantages for both affiliated producers and consumers (Appleyard & Chesbrough, 2017). Since Gaia-X participants are often both – provider and user of data – the approach taken is of particularly high functionality. Benefits for data providers are lowered development and launch costs, quality improvement due to a joined development environment and increased speed to market. This, in turn, translates into the benefits of data users since the reduced costs are reflected in the price (up to being open source) as well as a direct incorporation of feedback and implementation of specifications in the development cycle (Chesbrough & Appleyard, 2007).

Challenges identified, faced and tackled

Nevertheless, open strategizing also presents those involved with the challenge of finding or losing established business models of value appropriation. In the case of Gaia-X, there are two factors that endanger common business models of participants:

- The lower costs (should costs be charged) of developed services or products are passed on directly to the user of the data. This significantly reduces the achieved profit.
- Differing ownership of input data, managed through data sharing agreements and data use statements, impedes the distribution of the benefits achieved.

Hence, participants have to find new ways to appropriate value within the value chain and thus generate profit from their engagement in the digital business ecosystem(Chesbrough, Heaton, & Mei, 2021; Hautz, Seidl, & Whittington, 2017). According to Mr. Tardieu the participants at Gaia-X are fully aware of that challenge:

"Of course, our concern is how do we create data spaces in which those involved will be able to further their own interests too. We also think about how those who put the most effort in from the start don't lose out to those who might join later when the hard work is done. We reject the idea of selling data. It is an old-fashioned way of thinking."

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Part of this process is the integration of researchers as they are developing novel ideas to tackle this challenge. A recent idea explored is the approach of 'Tickenomics', originating at the University of Toulouse. The underlying mechanism is illustrated by Mr. Tardieu through an analogy:

"One example [of Tickenomics] would be to suppose you are in a place with no transportation system. You are selling tickets (or lots) to travelers, to towns and to whole regions. At some point, you will have enough money to create the transportation system. And that is when the tickets become valuable. It might be slow getting started but as soon as everything is in place, it takes off quickly. So we are looking at ways we might introduce 'tickets' without the possibility of these leading to monopolies."

Furthermore, open strategizing (Gooyert, Rouwette, & Van Kranenburg, 2019) allowed the participants of Gaia-X to identify the following barriers which hinder the successful realization of the visionary mission:

- The absence of portability (also known as vendor lock-in or the risk of 'mainframe syndrome') – preventing companies from committing to cloud due to future risk.
- The potential lack of interoperability – whereby differences in the technical infrastructure may hamper or even render data sharing impossible.
- The importance of data sovereignty – as otherwise companies would refrain from moving to the cloud due to the risk of misappropriation of shared data.

At the same time the mission-driven initiative also produced a mode of operation to tackle these barriers according to Mr. Tardieu:

"The challenges of data portability, interoperability, and common commercial and legal frameworks have different implications for different industries. That is where Gaia-X is helping participants come together to define use cases for their industries and to share information that can make industry data spaces possible. This collaboration is important.".

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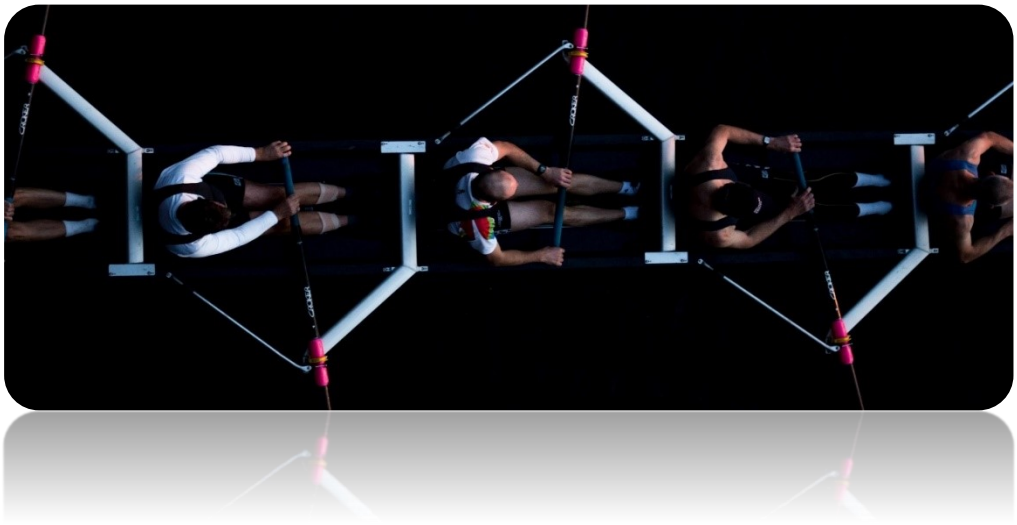
Gaia-X enables mission-oriented work in industry-specific projects

With the mission, design and barriers of the digital business ecosystem being fleshed out, naturally, the question occurs how Gaia-X will manifest itself through the realization of projects. Mr. Tardieu pointed out that domain clustering is of importance as it defines groups to create "data spaces" on an industrial level. Therefore, the FSI industry is a prime pilot since, due to the high level of regulation, collaboration between participants of the public and private sector is required when tackling the challenges of data portability, interoperability, and common commercial as well as legal frameworks.



"By working together, they (public & private actors) can increase the chance of success. And this isn't just about sharing data, remember. It's also about infrastructure too. Especially where regulations dictate compliance at a local level. You can't just do it at the application level. This is something Gaia-X is working on."

Furthermore, he stated that the FSI industry "*is 'ahead of the pack' because of PSD2* (for a brief overview of PSD2 see this blogpost). *We wouldn't have seen the huge development of Fintechs without it. But this is only half of the work. Data ontologies are key and you will soon see the priority use cases from the financial services and insurance sector start to emerge based on Gaia-X projects.".*

The first pilot project – the Safe Financial Big Data Cluster – investigating the use case of a joint platform to fuel artificial intelligence services, is currently developed by participants of the private and public sector with involvement of FINDER (for an introduction see this blogpost).

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Added benefit to the FSI industry through Gaia-X

While there are different initiatives (for instance, the EU Alliance for Industrial Data and Cloud) Mr. Tardieu sees the benefit of Gaia-X in its holistic approach since it is the only initiative that is addressing all the necessary elements together from root-to-tip. The initiative captures the alignment of technical standards and services for interoperability and portability (the roots) through the federated trust and sovereignty services (trunk) up to the definition of ontologies, APIs and technology standards for compliance (leaves).

"Gaia-X may seem gigantic but we don't think that the big issues we are trying to tackle can be 'sliced' into smaller parts. In Financial Services and Insurance, this is especially true at a time when cloud adoption needs to accelerate and there is so much change within the industry."

Policy advice

The insights provided in the session conducted by FINDER revolve around the Gaia-X project and highlights how supranational, inter-organizational projects can foster the competitiveness of specifically targeted industry. Gaia-X clearly shows that such projects are dependent on a clear cut problem from which a mission is derived (Edquist & Zabala-Iturriagagoitia, 2012; Mazzucato, 2018)

The problem the European financial service industry faces, is a decrease in global importance. So far the field of propelling the industry has been left to US and Chinese actors who have been predominant in the adaptation of technological innovation. European actors have to step up their game to secure data sovereignty and thus obtain a competitive position when it comes to data-driven financial services. Accordingly, Gaia-X is a response to increasingly structural change, fueled by technological innovation. Its mission: enable participants that are reacting to the challenge of adaptation with increasing speed(Schwab, 2017).

The session conducted highlights a best practice of open innovation projects organized as ecosystems. Setting a focal clear-cut joint mission enables:

- To bundle both relevant actors of the private and public sector,
- unite them under supranational umbrella, and
- set clear boundaries in the form of targets to achieve feasibility and focus.

In this chapter we have gained further understanding of the newly emerged perspective of interorganizational activities within ecosystems, and were provided insights profitable for both practitioners engaging in ecosystems, as well as policy-makers who want to support the emergence of ecosystems as drivers of innovation. Now let's see what challenges the digital era brings to within-firm strategizing.

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Chapter 3
Within-Firm Strategizing in the digital era

The digitalization also imposes major challenges for established firms that need a change of their strategy for adaptation. The first article within this chapter summarizes the previous chapters as a point of departure from which the necessary shift in companies' strategy can be derived. The change that is needed, however, not only revolves around how companies approach innovation but also around the mindset of decision-makers. Hence, being aware and incorporating behavioral influences shouldn't be overlooked. Consequently, these articles lead to a depiction of how collaboration aimed at innovation has changed followed by an outlook of how banks may take an active role within the transformation.

What happens when the financial industry turns upside down?

– by Ivo Luijendijk, Global Industry Director Financial Services & Insurance, Global Blockchain Director and member of the Atos Scientific Community –

The financial services industry is changing. It's no longer the slow and steady industry that it once was, and its customers are no longer fully dependent on the ability and willingness of the big banks to help them. In this revamped era, the relationship between bank and customer has been turned completely upside down: it is now the customer in control and calling the shots!

In part, this is due to new players emerging in payments, crowdfunding, investing and other services traditionally only delivered by banks. This demonstrates, to some extent, how technology can be a great driver of fairness and equality, a concept explored by Carlos Van Prabucki (Atos COO of Global Financial services) in his blog here.

Only banks that can meet the fast-paced and personal demands of their new generation of customers, will continue to thrive. In fact, their very survival is at risk as regulators are actually driving industry innovation with regulations like PSD2 and Open Banking empowering customers to make their own choices, based on what service provider (bank or otherwise) offers the best services: lowest prices and, perhaps most importantly, optimal personal relevance. This means that banks need to be able to quickly adopt new psychological and technological developments in order to stay relevant. Artificial Intelligence can help personify what banks offer to their clients, and how they approach them. Robotic Process Automation can reduce overhead costs in the back-end and improve processing time for greater client satisfaction. Quantum can reduce the impact of financial risk mitigation, both freeing up budgets for other purposes, like continuous innovation of customer experience.

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Managing the switch

Now that Fintechs (and other startups like Insurtech, Pensiontech, Regtech and crowdfunding platforms) are raising the bar for customer services in the financial industry, banks feel the necessity to change their pace in the area of customer services and solutions as well. Of course 'change' and 'innovation' make little sense if you are caring for a stable and proven infrastructure that simply needs to work. That is not an environment where you want to take risks, and therefore stability is the priority.

This means that we now see that a strong division emerges between the agile customer-centric services, and the steady and trusted processing infrastructure. Adaptations need to be made to keep up with the dynamic changing world. So, how can banks manage this new disintermediation with their clients?

Bringing innovation in

To achieve agility and provide great service quickly, banks are more frequently using partners in Fintech, InsureTech and crowdfunding platforms to deliver their service layer for them. This offers a speedy response to customer service needs and allows them to "buy in" to the best in technology design and new ideas (Hornuf, Klus, Lohwasser, & Schwienbacher, 2020).

Banks, in short, are evolving from monolithic institutes with huge control over their customers into agile (Bigelow, Nickerson, & Park, 2019), open banking platforms, (Zachariadis & Ozcan, 2017) vying for the favor of customers by attracting the best partners to support rapid innovation.

In order to adapt to these changes, it is key to adopt a high level of digitalization within their services. But this also creates crucial dilemmas for banks to face. For instance, is our current operating model (including employees) able to support such an agile and partner heavy way of working? What would a potential new Digital Operating Model look like? Or other questions, like how can we make sure that our platform is best suited to the needs of customers and gain favor over the others offered by competitors? And how can we weed through the ever-expanding field of start-ups and scale-ups and select the smartest and most innovative partners to include in our platform (Gomber, Koch, & Siering, 2017; Hornuf et al., 2020; Mention, 2019; Romānova & Kudinska, 2016; Temelkov, 2018)?

Another dilemma that banks face is how this high level of digitalization will impact the underlying infrastructure, and how they can keep a more open banking industry safe and protected? Do they need to improve security with new technology as well?

All these questions contain a world of details and potential solutions that can be explored in later research. But let's quickly scratch the surface of the last question, namely how security needs to be matched with the fast-paced digitalization.

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Underlying infrastructure

As the ever changing services layer moves further away from the stable infrastructure, the limitations of this 50+ year old design become more and more apparent. SEPA (payments standardization) and Instant Payments (end-to-end processing of transactions) go a long way towards improving this logistical pipeline in finance, but in the end they are nothing but patches on an already sewn-up blanket. They do the trick now, but can such a centric solution, focused on a single trust agent in the middle continue to support such a rapidly developing industry? Can it even properly support a more mature sharing economy or circular economy that works more on principles of micro transactions and future processing than simple straight through processing of transactions (Arner et al., 2015; Balyuk & Davydenko, 2019; Gomber et al., 2017; Philippon, 2016)?

All these factors will mean that infrastructure requirements will continue to rise for fraud prevention, privacy protection, (cyber) security, transaction speed and product improvement. On top of this, with a growing number of actors, one can wonder if banks should continue to process transactions themselves or whether this is best left to a few back-bone specialists who can reduce maintenance costs. And if all this isn't enough, we also see new entrants emerging to compete with the stable banking infrastructure. For instance, how can distributed processing (DLT or Blockchain) be of impact (Goldstein, Jiang, & Karolyi, 2019; Hornuf et al., 2020; Mention, 2019)?

A new world in banking

In no other industry we are able to see the impact of emerging technologies and how they are changing business models and the world economy for good so clearly. In our recent thought leadership paper, Journey 2022, we talk about the digital dilemmas business will face in the coming years and how the needs of people and society will take a central position – this is being played out beautifully in the financial industry right now.

Banks and insurers alike face fundamental questions and need to take decisions that will reshape their organizations for good. One thing is certain though: with the pace of change the industry is following, doing nothing is not an option.

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The signaling effect of M&A announcements

– by Jonas Röttger, FINDER ESR –

How much confidence to convey if you are considered overconfident?

With a view of foreseeing future trends and possible developments in the digitalization of financial services, the top executives possess particular influence on their firm's governance. Thus, the below study examines how chief executive officers' (CEOs) overconfidence can influence the quantity, quality and direction of corporate performance.

CEOs helming the next acquisition are commonly expected to convey confidence in the outcome of their recent strategic decision to pair up with others for the future. However, too much confidence by the CEO, also known as CEO overconfidence, can jeopardize the value-creation of deals due to a higher likelihood of overpayment: CEOs who are overconfident believe they possess superior capabilities in deriving synergy from acquisitions, leading them to make higher bids than more rational CEOs.

Overconfidence is a widely spread human phenomenon. It affects humans' belief in their capabilities and the precision of their judgment. For instance, people often believe themselves to be better-than-average car drivers, which violates a rational conception of an average. People in powerful positions are even more prone to fall victim to overconfidence since their assignment indicates superiority by nature. Hence, it is not surprising to find overconfidence among CEOs.

In the context of mergers and acquisitions, overconfident CEOs represent a risk to shareholders. While it is common to observe the acquirer stock plummet upon acquisition announcement, this reaction is especially true for acquisitions that will be helmed by overconfident acquirer CEOs. So how do firms helmed by more overconfident CEOs communicate acquisition announcements so that investors do not start selling their shares?

We conducted a study on acquisitions by S&P500 constituents between 2014 and 2020. Using an automated linguistic analysis on acquirer press statements, we found that investors react more positively to acquisitions by overconfident CEOs if the firm's announcement press release conveys less confidence in the deal. That represents an exciting finding since usually conveying confidence in a strategic decision represents a positive signal for investors to draw on. However, it seems that the effect depends on who is signaling the confidence. In the case of an overconfident CEO, it appears investors prefer a bit less confidence, maybe because that shows a more realistic view of a given deal, which evokes confidence in investors that the acquirer is on the right track.

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While the linguistic analysis of firm communication does not represent a novelty for business analysts or researchers, the interaction of CEO characteristics (i.e., CEO overconfidence) and firm communication is not currently scrutinized. Hence, this is also something to be considered by marketing and public relation departments when announcing deals to the public. Considering the past performance and press portrayal of the CEO might be valuable when writing press releases.

Banks still face challenges when it comes to data and how they can be addressed and used. Overcoming data challenges would help banks to better meet the needs of their customers in the digital finance transformation. Ultimately, it could set banks to extract more value from their internal data for their customers and power this transformation for future success in the Fintech era.

Emotion recognition technology in the financial sector: Curse or blessing?

Emotion detection and recognition is a hot topic in the tech industry. It could enable companies to react to emotional states of their customers by e.g. hindering or fostering impulse purchases, changing the tone of voice in customer services or identifying product functions that are extremely frustrating to use. For instance, virtual assistants like Siri could assess when people are screaming furiously and react more kindly – if that is not fanning the flames. In general, the emotion detection and recognition market is a

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huge and rapidly growing one: in 2012 it was estimated to be worth $12 billion and some people expect it to rise to $90 billion by 2024.

How does emotion recognition technology work?

Based on the analysis of voice and facial expressions in videos, audio or images, machine-learning algorithms try to predict the current emotional state of humans. These days, this is often done through supervised deep learning algorithms (mostly convolutional neural networks) which are previously trained on large sets of manually labeled data. The labeling is done by human raters who assess which emotion they perceive as most prevalent in a given image or piece of audio. The analysis is often limited to the so-called "basic emotions" (happiness, sadness, fear, anger, surprise, and disgust) which are believed to be universal and identifiable by all humans independent of their culture.

How is emotion recognition technology used in the financial sector?

Personal finances are an emotional topic for many people. Studies have shown that the emotional state has a significant influence on the ability to make wise financial decisions. This is an interesting point for banks and financial institutions that want to build services around their customers' needs and feelings. One of the first movers in this domain was the United Bank of Scotland who partnered with an emotion recognition software company in 2016 to assess customers' preferences concerning wealth management in a pilot study. However, the software was never adopted, despite the enthusiastic statement of UBS' chief investment officer who dreamt about identifying his customers' "subliminal desires". Rosbank, a Russian bank whose majority shareholder is Societe Generale, decided to use emotion recognition software in call centers to calculate a "customer satisfaction index" in real-time. This is supposed to help operators identify the most critical issues but can also be used as a KPI for call center employees. Moreover, WeSee AI adopted emotion detection and recognition software to detect insurance fraud. The company promises to be able to assess the validity of claims "more significantly and accurately than ever before" through automatically evaluating people's emotions. Overall, it seems that companies in the financial sector like the idea of using emotion recognition technology. But how reliable is the technology currently? In the following, we will assess the technology's maturity level from a research perspective.

How far developed is emotion recognition technology?

The scientific background for emotion recognition technology is weak. The latest report by the AI NOW Institute of the New York University argues that the technology should, therefore, be banned from application in decisions that affect people's lives. We are going to discuss two major reasons the authors state in their report.

Displaying and feeling are not the same

Current psychological research concludes that displayed emotions do not necessarily reveal the actual inner emotional state of a person. Hence, it is misleading to rely on software that is only analyzing a

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fraction of all signals that have to be considered to assess a person's mood (including asking how she or he feels). A recent paper by the Association for Psychological Science revealed that facial expressions alone are a very weak indicator to determine someone's real feelings. If financial products and services are built upon these assumptions, they at best add noise to their analysis and at worst disadvantage people or at least offer negligent consulting. Furthermore, facial expressions and tone of voice are for the most part under voluntary control. That could lead to absurd behavior when people interact with emotion-sensitive software: people could scream at call-center software just to be forwarded to a real person. This seems far-fetched but technology has always had behavior-changing effects on society: an ongoing study with currently 66.000 participants found that people are on average checking their phones 35 times a day to see (among other things) whether somebody texted them. Just imagine people running to their mailbox 35 times a day, seven days a week.

Illegally scraped and biased data

Finally, the data sets that are needed to train the emotion recognition algorithms are often created by scraping websites without the informed consent of the people pictured in the harvested images or videos. This practice seems to be applied by both companies and research institutions. Not only does this present a violation of privacy rights, but it can also imbalance the composition of training data sets, leading to wrong conclusions: a study found systematic racial biases in two well-known and widely used emotion-recognition software (Face++ and Microsoft's Face API). Software that detects negative emotions based on racial biases could propose very conservative financial products that significantly lower the interest rate of their clients and therefore, further increases systematic racism.

Final thoughts

Facial recognition is often a necessary antecedent for emotion recognition software. Therefore, it is encouraging to see that the tech-savvy city of San Francisco recently stopped using facial recognition software and that a bipartisan bill to regulate commercial use of facial data is currently discussed in the US congress. To conclude, emotion recognition software is still far from being applicable in most business settings. Especially in finance, as an industry that has a strong direct influence on the well-being of people, companies should be careful not to draw wrong conclusions or overestimate the technology's potential. Researchers have to stay ahead of the industry to ensure transparency and be able to act as technological and ethical evaluators.

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Collaborative innovation: a (fin)tech challenge

– by Rick Aalbers (Radboud University) –

Collaborative innovation between fintechs and incumbents can be a challenge due to several factors. From the point of the fintech, one of the main challenges is the regulatory environment, which can be complex and time-consuming to navigate. Fintech companies typically need to ensure that their technology is secure and compliant with industry standards and regulations. Additionally, many fintech companies operate in highly competitive markets, which can make it difficult to collaborate with other companies or partners. Finally, there can also be cultural and organizational barriers that make it difficult for companies to work together effectively.

From the incumbent point of view, for instance extant banks or insurance companies, challenges are of a different nature, yet equally difficult to navigate. Collaborative innovation can be challenging for incumbents for a number of reasons. Their inherent bureaucratic structure makes that Incumbents often have a hierarchical structure which makes it difficult for different departments to work together and share information effectively. It is not uncommon to encounter a risk-averse culture at established financial service players: Incumbents commonly tend to be more risk-averse than new market entrants, which can make them less willing to invest in new and untested ideas. Additionally they find constrain in their legacy systems. Incumbents often have legacy systems and processes in place that can make it difficult to integrate new technologies or innovations. As if these do not ramp up to ample challenges already incumbents also find hold back due to the typical short term focus linked to their management cycles and incentive structures. Therefore incumbent banks or insurers may be more focused on short-term financial performance than on long-term investments in new technologies or innovations. Equal to startups in the fintech domain competition matters: Incumbents may be just as reluctant to collaborate with potential competitors, and sometimes even more so as resource dependencies play less of a role than among startups that unite to stand a fighting chance in the first place, carving out new platform technology and operating models in initial collaboration modus.

As with many mature industries, the financial industry that has taken a keen interest in fintech over the past decade also finds collaborative constraint in inertia: Incumbents may be resistant to change and may not see the value in collaborating with external parties. Combined with the general intellectual property concerns, incumbents may be concerned about losing control over their intellectual property or proprietary technology. These challenges in turn make it difficult to find the right innovation partner: Incumbents may find it challenging to identify the right partners to collaborate with, especially in terms of size, culture, and strategic goals.

Despite these challenges there certainly is value in collaborative innovation in the fintech realm however.

Collaborative innovation (hereon after also referred to as "CI") is a process in which multiple players contribute towards creating new products, not just with customers and suppliers, but also users and competitors (Heil & Bornemann, 2018; Najafi-Tavani et al., 2018). Given the progression, and especially

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expansion of online platforms these past years, new collaborative innovation constructions have emerged. These new found collaborative endeavors are crossing-over into other organization forms, discarding the classical organizational boundary lines and allowing for a more democratic way in which decisions get made when it comes to collaborative ideation. The recent COVID-19 pandemic notably impacted these developments prompting for a swift response as most workplaces needed to shift from working on-site, to working online in a remote setting. As outcome of this massive social experiment platforms such as Zoom, Teams – but also bespoke corporate platforms crafted for more proprietary knowledge exchange – proved to be the only way to partner up with other innovation associates. As such collaborative innovation suddenly changed established directives regarding how to access and contribute to the production of innovative (novel) commodities and services. Already deeply embedded in digital technology, the financial services proved to be a frontrunner on this terrain.

Yet, although online communications have sky rocketed these past years, we still do not know all there is to know about the adaptation process within or between organizations to these new means of interacting (Dahlander, Gann, & Wallin, 2021; Rangus & Černe, 2019). Friction between an on-site workplace, and a remote one is a quite obvious observation when one would tap into the average organization in the early and late COVID times. Despite these frictions, online collaborative innovation has skyrocketed. Hence there is a clear need to better understand the mechanics of today's high-tech applications that facilitate online/offline interactions geared towards collaborative innovation (Autio & Thomas, 2014; Ritala & Hurmelinna-Laukkanen, 2013). This raises the following research question: how does collaborative innovation that crosses over between online and offline interaction allow for and stimulate the rapid growth of innovation ecosystems? And what happens if employees return to their on-site workplace? What restraints are in place when only communicating via online podiums?

For players in the financial services industry, and the fintech domain at large, Collaborative innovation in the fintech industry can bring value in several ways:

1. Access to new technologies and expertise: Collaboration allows fintech companies to access new technologies and expertise that they may not have in-house, which can help them to stay competitive.
2. Speed to market: Collaboration can help fintech companies to bring new products and services to market faster by leveraging the resources and expertise of partners.
3. Lower costs: Collaboration can help fintech companies to reduce costs by sharing resources and expertise with partners.
4. Increased innovation: Collaboration can lead to increased innovation by bringing together different perspectives, skills, and expertise.
5. Greater reach: Collaboration can help fintech companies to expand their reach by accessing new markets and customers.
6. Compliance and security: Collaboration can help fintech companies to meet regulatory requirements and ensure the security of their systems and data.

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7. Improved customer experience: Collaboration can help fintech companies to create better products and services by understanding the needs and preferences of customers.
8. Increased adaptability: Collaboration can help fintech companies to be more adaptable to changes in the market, technology, and customer needs.

Digital collaborative innovation

So the benefits to collaborative innovation for the fintech domain are apparent. As are the challenges. The role of digital in collaborative innovation is emerging as an important enabler to block off several of the previously outlined constrains, while catalyzing several of the benefits of collaborative innovation as listed above. ays digital technologies support collaborative innovation include:

1. Communication and collaboration tools: Digital technologies such as instant messaging, video conferencing, and project management software make it possible for team members and partners to communicate and collaborate in real-time, regardless of location.
2. Data sharing and analytics: Digital technologies such as cloud storage, data analytics, and business intelligence software make it possible for organizations to share data and insights, and to analyze and make sense of large amounts of data.
3. Innovation management platforms: Digital platforms such as Idea management software, Innovation portals, and crowdsourcing platforms are used by companies to manage, track, and prioritize ideas, feedback and suggestions from employees, partners, and customers.
4. Virtual and Augmented Reality: Digital technologies such as virtual and augmented reality are increasingly being used to facilitate remote collaboration and improve communication among team members and partners, for example, by allowing them to visualize and interact with designs and prototypes in real-time.
5. Artificial Intelligence and Machine Learning: Digital technologies such as AI and ML can be used to automate routine tasks, and help companies to make better decisions, these technologies are increasingly being used to augment the human intelligence, and thus, enhance collaboration and innovation.
6. Blockchain technology: Digital technologies such as blockchain can be used to create secure and transparent ecosystems for collaboration, for example, by providing a secure and decentralized platform for data sharing, and smart contract-based automation of business processes.

Yet, ICT-enabled collaborative innovation is still unexplored territory as research up to date limits itself to exploring the stretch of particularly characteristic kind of information in rather restricted settings (Aral & Walker, 2011; Bakshy, Rosenn, Marlow, & Adamic, 2012). When it comes to creative ideation and idea scouting, the front end of the corporate innovation trajectory, research has already shown that those who venture out online generate qualitatively much better ideas, as opposed to those who solely rely on more

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conventional means when gathering inspiration for collaborative innovation (CI) (Parise, Whelan, & Todd, 2015; Poetz & Schreier, 2012). Utilizing digital information channels exclusively, will gain access to more ideas to consider for instance, scaling information access in a merely limitless manner. At the same time, it is inclined to lead to elevated exhaustion due the risk of information overload. Venturing out online can result in one tapping into a limitless amount of knowledge, which could lead to discarding information that can very well be relevant. At the same time, the abundance of information available can also create difficulties sifting out the relevant inputs for those in pursuit of new ideas (Bergendahl & Magnusson, 2015; Piezunka & Dahlander, 2014; Neudert, & Kreutzer, 2021). Mechanisms to sift through relevant and irrelevant information as one digitally ventures out thus need to be in place (Whelan, Parise, De Valk, & Aalbers, 2011). Personal interaction, instead of merely online interaction, for instance facilitates personal feedback, which is a welcome addition to online idea initiation (Monteiro & Birkinshaw, 2012; Smits, Vissers, & Dankbaar, 2015). The sweet spot for collaborative innovation hence resides in the effective combination of the online with the offline. Combining digital and face-to-face interaction at hand, will ultimately lead to better idea assessment as it lowers individual work pressure. Figure 1 graphically illustrates this notion of communication channel multiplexity, illustrating how the availability of two types of communication channels, online and offline, result in three types of ties: those that are purely online based, those that are maintained purely offline, and relations amongst individuals that are maintained via both online and offline channels of communication.

Building on this channel multiplexity note, a recent study within the German automotive industry looked into how digital and face-to-face channels interacted when multiple organizations looked for ideas outside their own organization (Whelan and Aalbers, 2020).The authors shed light on how the organizations shared their new found CI knowledge, pointing out the relevance of channel multiplexity as facilitator for effective knowledge scouting and filtering. Specifically, studying the role of ideation jurors in digitally enabled CI, their research results strongly indicate that digital platforms can enable CI knowledge sharing – even between competitors. Particularly when transition from ideation to idea filtering, offline channels of interaction between idea jurors services a purpose, as it allows for trust-enabled knowledge sharing (to overcome competitive tensions) and cognitive flexibility (to prevent crowding) in order to support the digitally enabled CI platform. Additionally, research within the information sciences area literature discusses the connection between channel multiplexity and the innovative prospects of organizations (Cross, Borgatti, & Parker, 2001; Wang, Liu, & Parker, 2020; Zhang & Venkatesh, 2013). As part of this research line Zhang and Venkatesh (2013) Zhang and Venkatesh (2013) performed a field study at a large telecommunication company and concluded that – next to resources complementing one another – it also improved individual performance. Accordingly, both digital and face-to-face interactions are important when sharing knowledge in the CI domain, especially at the start of the innovation funnel. Furthermore, Wang et al. (2020) revaluated 83 studies on how ICT affects individual employees, finding that employee job performance indeed gets positively influenced by the combination of digital and face-to-face interactions.

A further (fin)tech note

Especially in the financial services, offline channels can meaningfully complement online channels in the filtering phase and avoid undesirable crowding effects. Under constant pressure of new Fintech initiatives,

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the financial services sector certainly is in pursuit of new skills, competencies, and resources to remain competitive. In the financial services domain management thus can for instance harness the effectiveness of those filtering for successful ideas by accommodating a complementary offline platform for interaction. A deep understanding of individual-level network dynamics is helpful for implementing strategy and organizational change (Hung, 2002; Lynch & Mors, 2019; Vogel, 2005). Yet strategizing in a digital world frequently commences without much concern for the offline in practice. Simultaneous and consistent offline interaction however can enable those in charge of filtering out the best ideas out there as juror set to improve the filtering of the truly valuable of ideas. : Offline channels such as workshops, seminars, or industry events can provide access to new ideas and perspectives from a wide range of individuals and organizations. On that note prior work on juror roles in idea filtering clearly suggests the effectiveness of a technology platform to rests on more than just the technical specifications (Denyer, Parry, & Flowers, 2011; Whelan and Aalbers, 2020). Offline channels such as face-to-face meetings or phone calls allow for personal interaction between individuals, which can help to build trust and understanding, and can make it easier to identify and address potential issues or challenges and find buy in for new ideas at hand. In the context of implementing collaborative innovation, a range of digitally enabled infrastructures impact core organizational activities. Hence close offline interactions should be central to any digital strategy initiatives to become truly successful.

Broadening up the rationale as to why offline channels can complement online channels in the financial services industry benefits of combined online and offline interaction come with concepts such as Improved feedback possibilities from clients, customers and /or employees. Offline channels such as focus groups or user testing can provide more detailed and nuanced feedback than online channels, which can help to improve the quality and effectiveness of new products or services. Offline channels can additionally help to increase the diversity of participants by reaching out to under-represented customer – but also labor-groups such as those operating for the benefit of the company in rural areas (think outsourced or subcontracted work to lower income countries, where informal and non-functional may access to online channels can be limited even in this era still. Additionally, by complementing online channels, offline channels can help to avoid undesirable crowding effects such as information overload or groupthink, which can occur when a large number of people are participating in the filtering phase online. Lastly, but often of high relevance and operational impact, Some financial services may require the use of offline channels to comply with laws and regulations such as anti-money laundering, and compliance with Know Your Customer (KYC) laws.

The above reflections on the role of offline channels next to online channels as enablers of collaborative innovation – and general interaction – in the fintech context also provides exiting grounds for future research by e new generation of digitally oriented researchers and practitioners. Future work for instance could should seek out how channel multiplexity between incumbent firms and startups affects collaborative decision as firms develop their join business model over time. As the startup scales, and the incumbent also matures in terms of how to govern its portfolio of (Fintech) startups over time, this raises questions about how to best utilize online next to offline communication in the context of a changing digital landscape, including its antecedents and the formal and informal relationships that underpin or define its outcomes.

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At the firm level there remains a need for a better understanding of the opportunities and challenges that come with the ever-evolving technologies constituting the firms' digital business model. How formal and informal, temporal or long lasting intra firm relations matter in dealing with inclusive decision making in a digital era is yet to be explored, as are the consequences for effective resource allocation and ownership.

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Orchestrating innovation ecosystems: the European Financial Big Data Cluster

– by Jonas Geisen, FINDER ESR & Luisa Kruse & Dr. Sebastian Schäfer, Fintech Community Frankfurt GmbH (TechQuartier) –

The role of hub firms within Gaia-X: a case study

When Gaia-X was initiated, many were uncertain what it would bring: a European cloud service provider, a new platform, open innovation? The initial mission was to "create a proposal for the next generation of data infrastructure: an open, transparent and secure digital ecosystem, where data and services can be made available, collated and shared in an environment of trust.". The aim of this mission is to develop common requirements for a European data infrastructure as a response to the increasing pressure on European business models on a global scale.

At this point in time, as we will show, Gaia-X is already delivering on it through various lighthouse projects, such as the 'Financial Big Data Cluster' (FBDC). Therefore, we deep-dive into the case of the safeFBDC explaining the progress made by highlighting how the project has evolved so far. Starting with the paradigm shift towards ecosystems for open innovation, we follow up by shining light on the emergence of the role of an ecosystem orchestrator and the dynamic capabilities that an organization taking up such a role should exhibit. We conclude this with our assessment of innovation hubs being prime targets as ecosystem orchestrators as they promote the competitive advantage of the entire business ecosystem, instead of only their own organizational aims, through its orchestration initiatives.

With this necessary fundamental understanding on ecosystems, we unfold the FBDC through our case study of the safeFBDC to showcase how this lighthouse project already successfully implemented an ecosystem to be opened and grown in future endeavors of Gaia-X.

Towards a new paradigm: ecosystems for open innovation

Digitization accelerates global structural change in previously unknown dimensions in successive innovative waves (Schwab, 2017). This ever-increasing technological progress has significantly driven down the cost of information processing, storage, and communication costs, a former barrier that keeps firms from making their optimal decisions when striving for excellent innovative performance (Altman, Nagle, & Tushman, 2015; Hilbert & López, 2011; Koh & Magee, 2006). Instead, the newfound wealth of information and the extractable knowledge imposes new challenges for organizations: the formerly abundance of optimal (or near-optimal) decisions has exploded so that organizations face the dilemma to decide out of a plethora of thousands of (near-) optimal decisions (Altman, Nagle, & Tushman, 2022). To enable themselves to make the best of their options, to reduce the risk of recurring failure when innovating, in face of today's rapid technological change firms have to adapt their process of bringing innovative value propositions to the market. To do so they are bringing down the barriers of competition by moving towards collaboration outside their organizations to a formerly unknown scale. This allows

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making the innovative process less risky through (1) an increased pool of resources as these can be harnessed from outside of organizational boundaries allowing organizations to efficiently search large solution spaces; and thereby (2) diversification of risk as with a joint resource commitment the sunk costs in case of a failed innovation are decreased. This shift toward the direction of cooperation gives birth to the new paradigm of ecosystems. As a new form of organizing themselves and their environment ecosystems allow organizations, willing to shift paradigm in search of innovativeness, to address today's complex challenges in science and business (Davidson, Harmer, & Marshall, 2015; Eisenhardt, Graebner, & Sonenshein, 2016).

But what exactly are ecosystems? Back in school ecology taught us that ecosystems are systems of living and non-living interacting components within the same environment. Applying this idea an innovative reader (Schumpeter, 1939, 1950; Schumpeter & Nichol, 1934) may think about something in the line of the following:

"*Business ecosystems are a network of firms with differing interests bound together as a collective whole such that the fate of its [actors] is bound to the structure of that network and the roles played by its [actors].*" - Tan, Tan & Oh, 2007: 2(Tan et al., 2020).

In its most basic form ecosystems are a form to govern a collaborative venture. In other words, ecosystems are a way to organize undertakings with a multilateral set of partners. Historically, we understand collaborative efforts as restricted to a joint value chain as alliances and networks are directly interlinked with a focal firm. In this light competitive instead of collaborative behavior was the norm when it came to innovative endeavors conducted by organizations of the same kind (Schumpeter, 1939, 1950; Schumpeter & Nichol, 1934). While this idea has prevailed for a long time the predominance of strict competition has been slowly losing ground to the idea of partial cooperation (Jacobides et al., 2018). The strategic behavior which combines both competition with cooperation, labeled coopetition, occurs when firms of the same market cooperate in the exploration of knowledge and research while competing in its resulting exploitation (Nalebuff, Brandenburger, & Maulana, 1996). Nowadays, with the backdrop of the risks of the technological transformation, this concept has culminated in ecosystems as they not only bring together coopetitors but a vast array of different firms - public institutions, corporations, as well as small and medium enterprises or start-ups.

However, there are more factors necessary for such an ecosystem to be of success. First, the participating organizations must work jointly on the same offer of a user value proposition (Kapoor, 2018). Such a common mission makes it attractive for participants to mutually grant access to assets and resources with the aim to create more value for their customers, reduce costs or improve business processes. Second, the ecosystem should be organized in a modular fashion (Shipilov & Gawer, 2020). Modularity is key for ecosystems as it prevents an overdependence on single participants (Baldwin, 2015; Jacobides et al., 2018). Achieving the missioned value proposition consequentially should not depend on a single participant, instead, the contribution of each actor within an ecosystem should be substitutable by a

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different actor. This ensures the fulfillment of the value proposition by preventing failure through e.g., the withdrawal of a participant from the ecosystem or an overconfident assessment of a participant's usable capabilities. A good example of modularity is, fittingly, a cloud server that can easily be adapted to customers' needs. Third, directly intertwined is the complementarity of ecosystem participants. Participants should not only be modular but provide complementary capabilities, in form of e.g., innovations, products, or services, with significant interdependencies (Shipilov & Gawer, 2020). Therefore, it is important that the ecosystem not only consists of coopetitors but diverse organizations from e.g., different industries or of different nature e.g., public or private, established or newcomer. Keeping the example of the cloud server, imagine we use it to host an Operating System (OS) platform with a complementary app. Without the OS platform the app does not work; with the app the OS platform can increase its value (and with increased usage also the value of the app itself). Should an increased usage deem it necessary, the cloud server can be adapted in its specifications.

Managing Ecosystems - The emergence and role of ecosystem orchestrators

Ecosystems built in a modular and complementary fashion allow their members, to some degree, autonomy in their activity. Consequently, the locus of control of ecosystem activities resides outside of the organizational boundaries of single members. An alignment, or more explicitly, a mutual agreement among the members regarding the value proposition but also the positions of and flows between participants, therefore, is necessary.

"*If we are to make strategic sense of innovation communities, ecosystems, networks, and their implications for competitive advantage, we propose that a new approach to strategy [called] 'open strategy' is needed*."
- Chesbrough and Appleyard, 2007: 5 (Chesbrough & Appleyard, 2007).

Accordingly, the underlying strategy determining 'how' to achieve the ecosystem's value proposition, while securing the participant's roles in it, (Adner, 2017) has to be a shared one (Gooyert et al., 2019). To achieve consensus in that matter ecosystems follow an open approach. Such an open strategy can be defined as "an openness in terms of inclusiveness, in other words, the range of people involved in making strategy; and an openness in terms of transparency, both in the strategy formulation stage and, more commonly, in the communication of strategies once they are formulated" (Whittington, Cailluet, & Yakis-Douglas, 2011, p. 532).

When it comes to monitoring and managing the implementation of the open strategy and thereby the activities between multiple, diverse stakeholders of an ecosystem one has to zoom in on the coordinative interactions of inter-organizational coopetition (Teixeira, 2014; Tsai, 2002). Only when we understand what an ecosystem orchestrator does, can we tackle the question who such an orchestrator should be. Naturally, the tasks for an orchestrator depend on the specific ecosystem, its members, and the value proposition that is pursued. However, to make it tangible for our readers we offer an exemplary set of

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activities, derived from a study of an ecosystem orchestrator (Reypens, Lievens, & Blazevic, 2021), that is likely to be encountered:

- Formulating the ecosystems mission
- Developing the proposal of the value proposition
- Stimulating initial encounters between members
- Bridging stakeholders in an effort to build the ecosystem
- Creating small teams for an agile way of working
- Stimulating bottom-up collaboration
- Discussing differences & raising awareness to showcase and utilize complementary
- Facilitating relationships within and outside of the ecosystem
- Assigning roles and a flow
- Providing flexibility to ensure modularity
- Motivating key contributors
- Monitoring progress
- Showcasing the ecosystem and sub-projects
- Showcasing results

These orchestration activities are exemplary as they depict dynamic capabilities such an orchestrator should have. Dynamic capabilities for orchestration are an organization's ability to purposefully adapt its resources and competencies to handle change in a flexible manner (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). In the case of ecosystem orchestration such dynamic capabilities can be synthesized as (Adner, 2017; Dhanaraj & Parkhe, 2006):

- Connecting; this encompasses tasks revolving around the consolidation of dispersed resources & capabilities e.g., knowledge, of members.
- Facilitating; by engineering processes to initiate and grow the ecosystem.
- Governing; in the form of overseeing the creation and extraction of value for members.

Having these dynamic capabilities for ecosystem orchestration, or at least exhibiting the ability to build them quickly, is of particular relevance as orchestration necessitates a leadership role without the benefit of hierarchical authority. Accordingly, the question of how to orchestrate and who should orchestrate an ecosystem is an intertwined question. Recent research has shown these questions should be answered with a decisive 'it depends' (Reypens et al., 2019). Naturally, the orchestration mode can be understood as a spectrum. On the one end of the spectrum, a core actor (or a small group of core actors) sets the collaborative agenda, recruits partners, and typically relies on formal contracts to steer relationships (Kazadi, Lievens, & Mahr, 2016)- accordingly, we call this dominating orchestration. On the other end of the spectrum multiple members collectively negotiate the agenda, membership is often voluntary, and trust predominantly governs relations (Roloff, 2008)- therefore we call this consensus-based orchestration. Table 1 contrasts the two ends of the spectrum showcasing the strengths and respective weaknesses of both approaches.

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Table 1: Dominating versus consensus-based orchestration modes (Reypens et al., 2021)

Orchestration mode	**Dominating**	**Consensus-based**
• Vision • creating connections	• Formulated • Set up arranged marriages and blind dates	• Negotiated • Build emergent teams around key contributors and key challenges
• Orchestration mode	• Dominating	• Consensus-based
• Coordination	• Top-down division of work • Centralized pooling of innovation efforts	• Bottom-up, self-selection into work • Decentralized aligning of innovation efforts
• Handle plurality	• Select complementary partners • Create convergence around common goal	• Create platform for collaboration • Create harmony and awareness of different objectives
• Control over outcomes	• Set goals and outcomes	• Provide flexibility to deviate from goals
• Member engagement	• Enforced through contracts	• Enforced through relationships

As is often the case neither of the ends of the spectrum is optimal. Instead, an ambidextrous approach, mixing both modes, is the most beneficial option. The so-called hybrid orchestration, lending to both sides of the spectrum over the lifetime of an ecosystem, allows an orchestration that makes the most use of (1) connecting, (2) facilitating, and (3) governing capabilities. Bringing together the exemplary tasks and orchestration modes allows to showcase that for some practices a certain orchestration mode is deemed more suitable than for others. As a result, switching between these and using a hybrid approach is optimal. Table 2 depicts this by mapping the aforementioned orchestration tasks to the respective orchestration mode considering the number and diversity of stakeholders in the ecosystem. The activities depicted can be understood as a toolbox of orchestration practices to address distinct challenges an ecosystem faces. The takeaway from table 2 is that different kinds of tasks are more efficiently fulfilled when either conducted by a dominant orchestrator or by a consensus-based group. Conclusively, switching between both modes - hybrid orchestration - ensures the most successful innovation trajectory over time (Reypens et al., 2021).

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Table 2: How dominating and consensus-based orchestration help orchestrators address distinct ecosystem challenges brought by the number and diversity of stakeholders (Reypens et al., 2021).

Orchestration mode	Dominating	Consensus-based
Dominating orchestration	• Practices to overcome ecosystem opacity • Developing project proposal • Assigning roles • Stimulating initial encounters • Bridging stakeholders	• Practices to create a shared representation of the project • Formulating project vision • Showcasing projects • Showcasing results
Consensus-based orchestration	• Practices to address collective action problems • Motivating key contributors • Creating smaller teams • Monitoring progress	• Practices to increase legitimacy • Discussing differences and raising awareness • Providing flexibility • Stimulating bottom-up collaboration • Facilitating relationships

The showcased exemplary tasks provide an understanding of tangible activities the orchestrator, either in the form of a focal organization or multiple members, could utilize to govern the ecosystem. These activities can be understood as a toolbox of orchestration practices to address distinct challenges through hybrid orchestration to ensure a success of the ecosystem (Reypens et al., 2021).

As some of the exemplary tasks already reflect ecosystem orchestration also necessitates the governance of members on a more intangible level. Bringing together diverse, modular and complementary organizations under one focal value proposition makes an ecosystem a potpourri of organizational culture. At the interplay of cooperation and competition, digital business ecosystem orchestration often requires a dual perspective on other seemingly contradictory situations. Wareham, Fox, and Cano Giner (2014), for instance, describe how orchestrators of digital business ecosystems need to balance tensions like openness versus closeness, standard versus variety, or individualism versus collectivism. Accordingly, an orchestrator should be able to set a culture that embraces the value of togetherness ('contributing to a focal value proposition'), working with tensions and contradictions ('embracing dualities') and active acceptance of uncertainty ('working with proto-visions') to set the right tone for successful collaboration. This is, however, not only the task of a single orchestrating entity. Instead, representatives of organizations active in ecosystems, need to achieve a mindset shift from competitive opposites ("them versus us") to a complementarity-oriented attitude ("collaborative but distinct"). As a result, managers in such settings often must build multifaceted identities and distinguish between their internal corporate

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role and the role they play with other digital business ecosystem participants (Neudert and Kreutzer, 2021).

Conclusively, the question of how and by whom ecosystems should be orchestrated can be best described as a "translucent hand" (Altman et al., 2022). Situated between the infamous invisible hand of the market (Smith, 1776) and the visible hand of organizational hierarchy (Chandler Jr, 1990) ecosystems are a hybrid form found right between both. While organizations engaging within an ecosystem retain their own agency, an orchestrator that shepherds all participants without exploiting them is necessary for guidance. Such a shepherd has the task to uphold the openness of an ecosystem (Adner, 2017; Tan et al., 2020) by enabling and implementing an orchestration which is both dominating at some and consensus-based at other times.

Innovation Hubs as ecosystem orchestrators

Technological innovation and the rapid development of ecosystems have often been credited with having significant strategic implications for organizations by shifting the competitive landscape and changing the industry's market dynamics. Against this background, so-called hub firms (or innovation hubs) play an increasingly important role for stimulating indigenous innovation in order to reduce dependence on foreign technology and enhance the innovative capabilities of German and European firms. Considering our foregoing explanations, we conclude, in line with literature (Russell & Smorodinskaya, 2018; Williamson & De Meyer, 2012), that an innovation hub provides the dynamic capabilities required for an ecosystem orchestrator to shape the ecosystem indirectly rather than through direct command and control. Dynamic capabilities are regarded as key for hub firms orchestrating business ecosystems (Gomes, Iivari, Pikkarainen, & Ahokangas, 2018; Helfat & Raubitschek, 2018). Still, most of the existing research focuses on how the hub company achieves its own competitive advantage by leveraging the ecosystem's resources. Only a few studies examine how the hub company promotes the competitive advantage of the entire business ecosystem through its orchestration initiatives.

Looking at the business landscape, in many contexts a hub firm coordinates services for the ecosystem (e.g., Gaia-X, Mobility Data Space). In these settings, the hub firm must coordinate, influence, and manage various players in the ecosystem to create value (Jacobides et al., 2018). Hub firms must balance various tensions, such as tensions between efficiency and inclusion, self-interested motivations and collective benefits, as well as complexity and high costs. Following this, they need to make decisions while considering what every other active firm in the ecosystem is doing. Hub firms may have control over the technological infrastructure, they may control the brand that determines the value of the ecosystem or regulate access to a given shared platform or community. In this way, hub firms are known as ecosystem orchestrators, purposefully building, and managing inter-firm ecosystems by using their prominence and power to perform a leadership role in pulling together the dispersed resources and capabilities of the different ecosystem actors (Scaringella & Radziwon, 2018; Su, Kajikawa, Tsujimoto, & Chen, 2018). Value creation and capture from the ecosystem are the main goals of the ecosystem orchestrator (Dhanaraj &

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Parkhe, 2006), which depend on two orchestration processes that a hub firm must perform, namely managing knowledge mobility and innovation applicability. Knowledge mobility is defined as the ease with which knowledge is shared, acquired, and deployed within the ecosystem, and the hub company bears the responsibility for improving knowledge mobility and use of competencies in the ecosystem (Autio & Thomas, 2014). At the same time, a hub company must also address another key issue, that of appropriateness, to ensure equitable distribution of value among ecosystem actors and to prevent potential free-riding and opportunism (Jacobides et al., 2018).

Case Study: Financial Big Data Cluster

Managed Ecosystems for the Financial Service Industry

The rapid development of technology is presenting financial services providers with major challenges. This particularly applies to the current and future positioning of the financial services industry, as users increasingly ask for digitized services. Accordingly, financial service providers have an increasing interest in platformization for the exchange of data but face, however, regulative and cultural challenges that have kept them from exchanging freely (Hendrikse, Bassens, & Van Meeteren, 2018; Khanagha, Volberda, & Oshri, 2014; Westermeier, 2020). For many, the question arises as to whether they want to digitize their business models and if they have the necessary capabilities to do so. Even for organizations that have such capabilities readily available in-house the positioning in newly emerging ecosystems to create new product and service offerings can be attractive. Especially ecosystems that are enabled through an IT infrastructure (Tan et al., 2020) allow innovation at the forefront as they intertwine business and digital processes (Nachira, Nicolai, Dini, Le Louarn, & León, 2007). Such ecosystems offer benefits as new forms of revenue generation, integration with specialized partners, greater customer retention, or sharing of costs. However, risks must also be taken into consideration ranging from the loss of customer interfaces to data security concerns, reduced margins, or the loss of established business models and brand identity.

According to a recent study, the business interest in participating in ecosystems is particularly related to a rising interest in monetizing data (Deloitte, 2021). This comes as data ecosystems have made a significant impact on multiple fronts across organizations in the past, e.g., improving customer satisfaction, increasing operational productivity/efficiency and reduction of costs. On the other hand, the increasing amalgamation of firms in data ecosystems could also result from perceived weaknesses in European data availability and access, especially among small and medium-sized companies, as well as regulatory barriers. The quest for ecosystems that offer innovative solutions is therefore also a logical conclusion, i.e., a diverse network of value-creating business partners is an essential part of a company's future assets.

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Approach and project context

In this article, we present a case study to investigate the orchestration activities of an innovation hub as ecosystem orchestrator and the role of ecosystem-based dynamic capabilities. Case study methodology is preferred when the units of study are not fully understood, complex and hard to isolate from real-life context. It enables detailed tracking of processes that cannot be controlled in the lab and are difficult to find in archival data (Yin, 2013). Building on prior research, we've selected the case of a multi-stakeholder innovation project - the Financial Big Data Cluster (FBDC).

The aim of FBDC, which started already back in 2019, is to build and establish an ecosystem for the sovereign exchange of data between multiple parties in the financial services industry, focusing in particular on the handling of highly sensitive financial data. The architecture should be aligned with Gaia-X requirements to ensure long-term interoperability. The main challenge of the FBDC architecture is to integrate and analyze data of multiple private institutions of the financial sector (e.g., Bank A, Bank B, Bank n) but also public institutions. Against this background it is also the declared goal of the consortium (see table 3) to tackle regulatory challenges and derive strategic recommendations for regulators, supervisors, and the public sector, when it comes to societal challenges such as e.g., money laundering. This ecosystem is bound by its set of goals and the project's mission. Within the framework of FBDC, it is to be shown how the European path of data sovereignty can become competitive with the commercialization of data in the USA and the surveillance approach of China.

During the last 1.5 years, the FBDC ecosystem has grown significantly in the number of partners and use cases, being initialized by the lighthouse project safeFBDC. This research and development project is run by a consortium of selected firms, supported by numerous associated partners covering a large part of the German financial services industry. In order to provide a business foundation for the projects - and thus for the emerging ecosystem - it is necessary to determine incentives and requirements of financial market participants to partake in data sharing and the ecosystem in general. The analysis of these research aspects takes place implicitly within different use cases that have been selected by the ecosystem orchestrator i.e., the potentials, challenges, and incentives that cross-organizational data sharing entails are identified in relation to these use cases. The elaboration of these results will be carried out across organizations by analyzing the incentives and requirements for data sharing in a business context from both a technical and an economical perspective.

safeFBDC: From creating competitive advantage to contributing to a focal value proposition

The project duration of safeFBDC amounts to three years (2021-2023). During this time, safeFBDC receives funding from the German federal ministry of economics and climate protection (BMWK). Fintech Community Frankfurt GmbH (short "TechQuartier") was selected as the leading orchestrator (hub firm) due to its neutral shareholder structure and expertise in building ecosystems.

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The consortium, which has come together under the leadership of TechQuartier, consists of private sector companies, startups and public institutions. Table 3 summarizes the involved ecosystem participants.

*Table 3: List of involved companies, legally bound by a cooperation agreement; *: companies subcontracted by one of the ecosystem participants*

Research Institutions (5)	Private Companies (6)	Startups (2)	Public Institutions (3)
• Frankfurt School of Finance & Management • Technische Universität Darmstadt • Fraunhofer-Institut für Materialfluss und Logistik (IML) • Fraunhofer-Institut für Software und Systemtechnik (ISST)* • Deutsches Forschungszentrum für Künstliche Intelligenz*	• Deutsche Börse • SAP Fioneer • Helaba Landesbank Hessen Thüringen • ING-DiBa* • Deutsche Bank • neosfer • TechQuartier	• Hawk:AI • spoti	• Hessisches Ministerium für Wirtschaft, Energie, Verkehr und Wohnen • Deutsche Bundesbank • Green & Sustainable Finance Cluster Germany*

The Diversity of the project becomes clear when looking at the involved parties: While young companies are often “agile natives”, incumbents have to embark on an organizational transformation journey to be an integrative part of the ecosystem. Balancing clear processes along corporate hierarchies with re-designed agile units and fully experimental setups requires a differentiated understanding of which organizational design optimally contributes to value co-creation (on an ecosystem level) and value capture (on an organizational level). Formally, the cooperation is regulated by a jointly concluded cooperation agreement.

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Orchestration activities (Case study findings): Ecosystem-based dynamic capabilities of the hub firm

As innovation hub TechQuartier plays the important role of the translucent hand in the FBDC ecosystem orchestrating members who seek to create value and extract value from the ecosystem. Following the approach of (Chen, Hu, Gao, Wang, & Liu, 2019) in figure 1 we summarize the key actions of the hub firm with an initial list of first-order concepts, related to the firms' *actions*. We retrieve this data from TechQuartier employees, which are amongst the authors of this article. We sorted this information and compared it across informants (employees) in order to identify key concepts and relationships among them for identifying second-order dimensions, linking them under *orchestration behaviors*. These second-order categories enable us to capture a higher level of abstraction and aggregate this into several key factors, namely *ecosystem-based dynamic capabilities*. Based on existing literature on ecosystem orchestration (Adner, 2017; Dhanaraj & Parkhe, 2006) we map the orchestration behaviors to existing dynamic capabilities of orchestration. Furthermore, we adjust these based on our observations of capabilities exhibited by the hub firm.

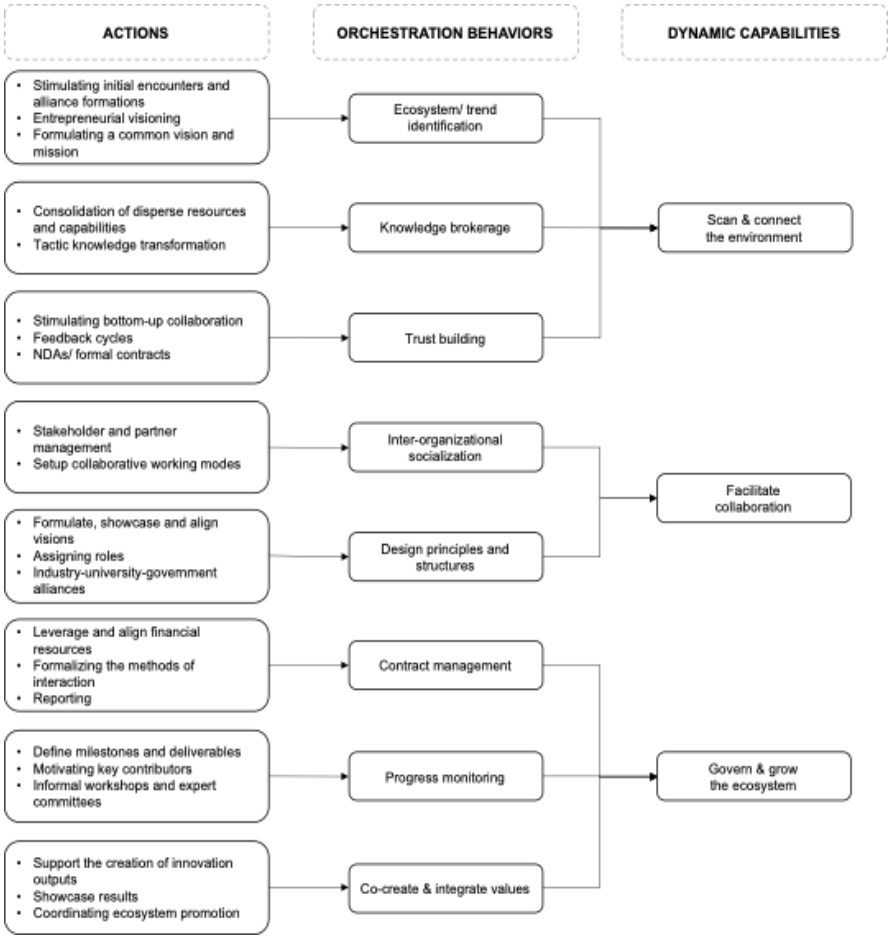

Figure 1: Information structure (adapted from Chen et al, 2019)

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Scanning and connecting the environment is a major orchestration capability of hub firms such as TechQuartier. It is key to combine the knowledge of their own and related complementary asset providers (e.g., start-ups) to identify trends and capture opportunities in response to the external environment and for the enhancement of the ecosystem. This capability implies that the hub firm can assess and select appropriate partners for the ecosystem formation. In the context of safeFBDC, TechQuartier was for example responsible for stimulating initial encounters and formulating a common mission, which also requires a certain level of entrepreneurial visioning. This mission defines the project's value proposition, binding together the ecosystem. Being driven by this value proposition allowed TechQuartier to build and understand the ecosystem in a structuristic approach, meaning that the vision defines further activities (Adner, 2017). Furthermore, we find that the capability of scanning and connecting the environment consists of knowledge brokerage and trust building. The former is another key factor for hub firms to sense external opportunities, to evaluate trends and to derive strategic recommendations. TechQuartier adopted several tactics for knowledge brokerage, including but not limited to brownbag meetings, expert lectures, roundtables, and research forums. The latter, trust building, includes for example measures for stimulating bottom-up collaboration. For innovation ecosystems, trust is crucial for the strengthening of ecosystem identities among related partners, underpinning them to cope with the uncertainty of the external environment. In the case of FBDC, the neutral shareholder structure of the orchestrator, i.e., the hub firm, is a central advantage and simplifies the paths for trust building, which include feedback cycles and formal contracts.

The capability of *facilitating* collaboration allows hub firms to organize the ecosystem actors in appropriate ways to leverage and gain essential resources for developing products and services, i.e., the innovation outcome (Jacobides et al., 2018). According to our case analysis, we find that this capability contains inter-organizational socialization and the design of principles and structures. To broaden inter-organizational socialization, it is an important task for the hub firm to strengthen communication and collaboration across regions, countries, and competitors. In the previous sections we have already outlined that this is a critical challenge for the ecosystem and its inherent coopetition. In our case, the inter-organizational socialization was even more challenging, since, until April 2022, due to the Covid-19 pandemic, no or very few physical meetings have been possible. Against this background it was necessary to identify other ways of communication and collaborative working tools (e.g., virtual workshops and alignment meetings or secure communication platforms and messenger services). To fully leverage the ecosystem members and strengthen the innovation appropriability, the hub firm should also employ several design principles and structures. Consistency in alignment and decision-making processes can have a strong positive impact on voluntary cooperation and discourage hoarding of ideas (Dhanaraj & Parkhe, 2006). In the case of safeFBDC, work-breakdown structures, i.e., the formation of smaller teams,

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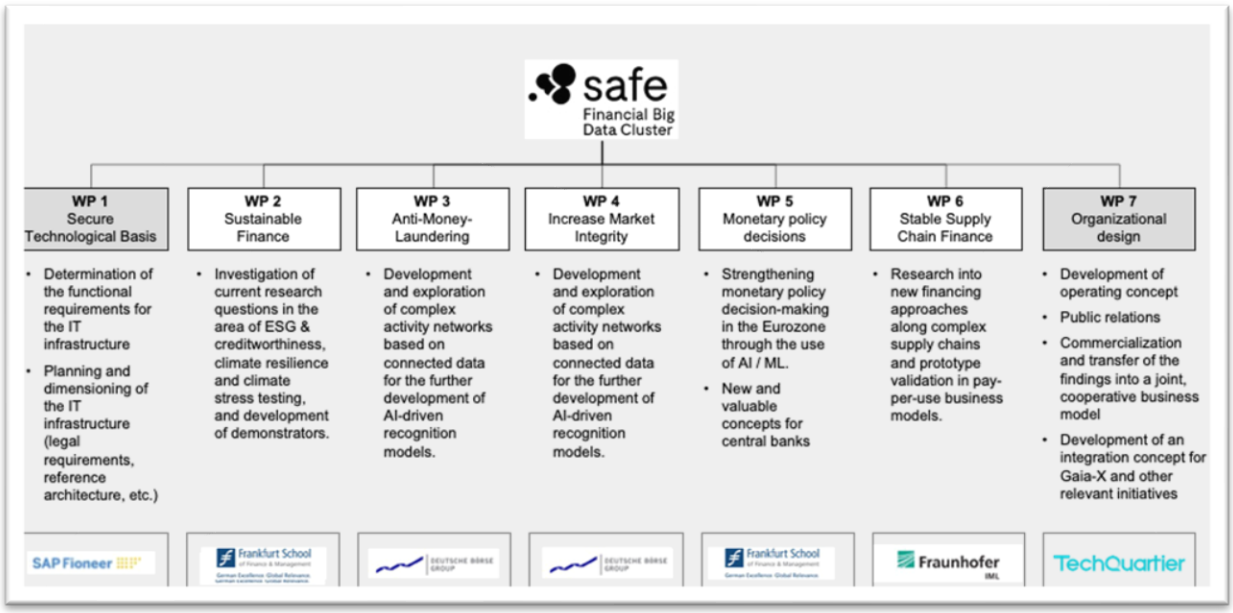
individual milestones and deliverables have been enforced, as depicted in figure 2. This was also necessary due to the diversity of thematic focal points.

Figure 2: Work-breakdown structure of safeFBDC (simplified)



Each organization holds specific roles and individual tasks. The regular meetings and open discussions of designated organizational representatives result in a dense, highly decentralized, and inclusive form. From the experience of TechQuartier, it is also apparent that more robust relationships can be built by a hub firm enforcing multiplexity, meaning that more than one relationship occurs at the same time within an ecosystem (Dhanaraj & Parkhe, 2006). Increasing multiplexity can help to expand the scope of relationships so that firms interact more broadly and deeply with each other. In our case, TechQuartier keeps establishing alliances between industry partners (start-ups and corporates), universities, research institutions and the local government and thus generates coopetition between partners by coordinating ecosystem activities.

Another important capability of the hub firm is to *govern and grow* the ecosystem and oversee the creation and extraction of value for actors of the joint value creation. According to our case analysis we find that contract management, progress monitoring, co-creation and integration of values are associated with this capability. In ecosystems, joint asset ownership, e.g., intellectual property right sharing with ecosystem partners, is particularly effective at joint problem-solving arrangements and innovation appropriability enhancement (Dhanaraj & Parkhe, 2006), so that self-interested motives can be aligned with common interest. In our case, formal contractual arrangements have been adopted in the interest of the ecosystem participants which sets rules for the distribution of joint value outcomes. This, however, limits to some extent the openness of the ecosystem, representing a bureaucratic barrier to the inclusion of additional ecosystem participants. TechQuartier oversees the contract management

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as the orchestrating hub and formally manages the ecosystem participants. The case of FBDC shows that progress monitoring is another important task of the hub firm, yet not an easy one. There exist several tensions, including the need for efficient operation vs. member involvement, the conflict between individual and whole interest or the equilibrium between complexity and high coordinating costs (Tiwana, Konsynski, & Bush, 2010). Thus, actions need to be selected carefully to motivate the key contributors and stimulate collaboration. It is fundamental to the hub firm to support the creation and integration of innovation outcomes to further grow the ecosystem. According to our case analysis, these actions can be manifold, ranging from promotional activities (e.g., fairs and exhibitions, social media presence) to acceleration formats (e.g., hackathons) or coordinating the relationships with local governments or related public initiatives.

Conclusion

The prominence of digital business ecosystems in today's economy raises questions about how to support collaboration between multiple, diverse stakeholders and, in the narrower sense, emphasizes the importance of ecosystem orchestration to make the digital business ecosystem flourish. Not every company is in a position or has the capabilities to be an orchestrator. You cannot unilaterally choose to be the orchestrator, but rather you need to be accepted by the other players in the ecosystem. The orchestrator should occupy a central position in the ecosystem network and have the ability to coordinate effectively. As stated earlier in this article, the orchestrator should be perceived as a fair choice by the other members, not as a competitive threat. Ecosystem orchestrators, such as TechQuartier, build ecosystems, encourage others to join, define standards and rules, and act as a mediator in cases of conflict. Nonetheless, one has to face the limitations both inhibited by the chosen orchestrator as well as the ones imposed by the environment of the ecosystem.

In case of the FBDC this means (1) legal restrictions that bound the scope of the ecosystem; (2) a lack of resources e.g., manpower and capabilities e.g., technological expertise of the hub firm and the ecosystem partners; and (3) the restrictions imposed by the limited external funding scope led to part of the initial value proposition being externalized into a new sub-project. In front of the Gaia-X backdrop the safeFBDC project in its light-house-project function is already on a good way to accomplish the vision of a joint standard through its interdisciplinary structure and the joint approach from the ecosystem. Finally, it is important to mention that a successful ecosystem not only needs orchestrators, but also contributors to create something new and valuable. At best, these should be innovative and have the capability to lead the ecosystem to new perspectives and products.

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Acknowledgments

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Policy Advice

With our whitepaper the FINDER project, in collaboration with TechQuartier, facilitates the understanding of how open innovation projects can be successfully implemented by policy-makers. To do so we study the case of the Financial Big Data Cluster (FBDC) to test the design principles proposed by research.

Since the millennium both the aim to develop inter-firm open innovation projects as well as research to enable that development has bloomed. Aim of these studies in the field of economics (Industrial economics, new geographical economics), economic sociology and business administration have been channeled to enable both companies as well as policy-makers to develop, implement and grow such innovation efforts (Arthurs, Cassidy, Davis, & Wolfe, 2009; Hamdouch, 2007; Yu & Jackson, 2011). However, ambiguity remains as both the organizational form as well as its implementation are both under discussion. For a long time the organizational form of innovation clusters, defined as a geographically arranged group of actors from a specific industry built around a dominant player, has been dominating (Delgado, Porter, & Stern, 2010; Engel, 2015; Porter, 2000; Yu & Jackson, 2011). Progenitor of this approach is the infamous Silicon Valley. While unrivaled in its success as a host of innovation the attempts to replicate it have been manifold but less successful. There is, however, a challenger regarding the conceptualization of open innovation - ecosystem thinking. Only recently has it gained prominence. While being relatively young this stream of research can be, due to the fuzzy multitude of definitions, difficult to navigate. Therefore, our whitepaper aims to equally inform policy-makers – what innovation ecosystems are and how to foster these - as well as intra- and entrepreneurs - on how to partake and organize within such formats.

Therefore, our whitepaper starts with stepwise fleshing out the core concepts of innovation ecosystems as multi-stakeholder projects. Focusing on one clear cut definition helps to unravel the design principles which are paramount for the fruitful support of an existing or even the successful initialization and implementation of innovation ecosystems. At the same time the question about the locus and level of control of such a multi-stakeholder project follows. From a policy-makers point of view a logical question as some level of control is necessary for publicly funded projects, as is the exemplary studied case of the FBDC, lighthouse project of Gaia-X.

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Sub sequentially, an overview of how innovation ecosystems can be managed, and to what degree, is provided. While at first glance it may seem detrimental, open innovation pursued through an ecosystem benefits, to differing degrees depending on its composition and developmental state, from being orchestrated. Orchestration itself is derived as a spectrum of being conducted by a central entity (in a dominating manner) towards jointly by all participants (in a consensus-based manner). Our case study, undergirded by research, therefore highlights that at least one managing entity, called an ecosystem orchestrator, that holds some locus of control enhances the chances of success. However, orchestration should be able to be switched task-specifically between the different modes. Especially for the initialization as well as the early stage a guided coordination - e.g., to formulate a shared mission as the pursuit of a shared value proposition - of the ecosystem seems to profit from a more central entity.

A subsequent question thus is what kind of entity should take the role of an orchestrator in a publicly financed ecosystem. We suggest an innovation hub due to two reasons. First, innovation hubs core value proposition is centered around the networking of multiple stakeholders as start-ups, corporates and universities - all vital actors within an ecosystem - as well as the orchestration of joint projects between these. Such experience provides a valuable lever for the difficult task of orchestrating a multitude of different ecosystem actors. At the same time this provides innovation hubs with a quasi-neutrality as their core business foundation usually is not based on the development of services or products for individual clients. These factors provide innovation hubs with a flexibility to not only orchestrate in a dominant but also consensus-based manner adapting to the situational necessities.

Given these design principles our whitepaper further investigates if and how they are applicable and conducted in the case of the FBDC. We find that the design principles elaborated upon are applied leading to the current success of the project. Ultimately, the overview of structure and observed best-practices can serve policy-makers as a template for future endeavors to initialize and implement ecosystems for open innovation.

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Three ways banks can kick-start the Continuum

– by Ivo Luijendijk, Global Industry Director Financial Services & Insurance, Global Blockchain Director and member of the Atos Scientific Community –

Last year, Atos published its 'Digital Business Continuum' whitepaper, which covers digital transformation strategies for companies facing potential disruption due to emerging technologies and new players on their markets. Now that PSD2 (the renewed European Payment Services Directive) is in full swing, there is no industry for which this potential disruption rings more true than banking. Banks truly need to continuously transform themselves in order to remain relevant.

It's fair to say that banks are used to a process of ongoing adaptation, due to (amongst others) the continuous influx of regulations and political agendas, the maturing of automation technologies that allow their back-office processing to become more intelligent, or due to new communication tech opening new avenues of interacting with the bank's (potential) clients. If we dive into this last example a bit further, we see that this started with high street branches. Since then we have developed ATMs, phone banking, contact centers, internet banking, and mobile banking. Soon, there will be virtual assistants available too. Yet this change has been gradual and driven mainly by technological developments.

Today, the pace of change has intensified. And it is not all to do with technology. Yes, technology is one foundation for industry transformation. But another cause is the customer itself.

As customers, we demand convenience, speed and seamless service. For instance, we like the convenience of ordering a taxi on our phones and having the money come out of our accounts while a receipt is added to an expenses app. Nowadays, we don't think in silos.

However, whilst banks crave platform-based architectures to offer customers this new style of all-round service, they are actually saddled with technology silos, because the linear changes we just discussed simply layered the technologies on top of each other. Banks cannot simply interact with clients on the high street branch anymore, but - for instance with the rise of social media- also need to focus on customer relations and marketing through multiple technologies.

This stack made the 'universal banking model' possible. But it's also incredibly difficult to break apart now that new business models and competitors are emerging. Fintechs have looked at the complexity of big banks and said, "No thanks" to its complexity. They have started with a blank slate and built businesses on platforms. They are also replacing these platforms regularly (in some cases every three years) as soon as they need to move on, so they quickly adapt and innovate extensively.

This is the Digital Business Continuum in full effect.

But let's be clear here. The Digital Business Continuum is not focused on these emerging organizations. It is focused on digital transformation in huge organizations.

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As we read the Atos whitepaper, it reminds us of an interesting piece on Chris Skinner's blog. It covers four potential business models that large banks could adopt. In the author's view, one of the most successful models will be "to combine open distribution with the provision of a few strategic services sitting on top of a vertically integrated infrastructure". In other words, brand what you do best and drop what you don't need to do, while building an open network with other providers - all so you can serve your customers better.

So what does the Atos whitepaper teach us about achieving this?

The first is resource allocation. Typically, banks are relatively static organizations that keep resources and structures in place for lengthy periods. This makes it difficult to change by, say, moving staff from a branch to a digital role. Lloyds Banking Group in the UK and Crédit Agricole in France have announced Digital Academy-type initiatives so people become organizationally mobile. As the whitepaper points out, this is just one area of resources that needs to be addressed and changes must be pervasive.

The second area is leadership. The whitepaper highlights how change, particularly continual change, requires purpose and leadership. Banks are often run on a command and control basis, arranged by product groups and organized by channels. This has made for a complex environment in which it is difficult to shift from a product to a customer-centric customer approach.

The third area is governance. Banks have an inherent bias in respect of risk. Continual transformation demands a change in attitude towards success and failure. The whitepaper explains that "risk management" very often actually means "risk avoidance". It also suggests that, 'When learning from failure, the attitude should be one of "how can we do this better next time?", rather than one of "how can we avoid doing this in future?".

These starting points are a great way to kick start the bank's digital transformation, but should not be seen in isolation. But they are also sure-fire ways to kick-start continual transformation so the bank—with whatever business model it decides to adopt—can thrive in a constantly changing world. After all, like Darwin already said: It's not the strongest of the species that survives, nor the most intelligent; it is the one most adaptable to change. And because of this fast-paced digitalization, pressure is put on its survival.

Now that we have a better understanding of the necessity for firms and individual decision-makers to change their strategizing and approach to innovation, adapting to digitalization, the following chapter will illuminate, not just that, but moreover how fully embracing data as a critical resource is essential for companies to future-proof themselves.

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Chapter 4
Data fuelling innovation in a digital era

Research on new ventures indicates that with the current digital developments, new choices emerge for entre- and intrapreneurs. This chapter illuminates how fully embracing data as a critical resource is essential for companies to future-proof themselves. Turning companies into data-driven and customer-centric organizations that embrace collaboration as a key strategy is a promising pathway in the financial services industry.

Yet, different data categories require different levels of confidentiality and hence, privacy-preserving measures. One opinion described under the section on building convenient data privacy argues to empower individuals to decide which information they would like to share with a company and design this process as convenient as possible. However, data can reveal itself[31] *even without actively sharing it. In addition, data that customers do not yet fully deem worth protecting is already gathered and used by companies through various channels. In this chapter, we introduce data triangulation as a common privacy violation phenomenon that happens because of data abundance. Subsequently, we share a vision for a fully customer-centric and data-driven bank.*

With this chapter we aim to start with a micro perspective on the innovation and transformation of the financial service sector as it is both exemplary due to high external and internal standards (necessarily imposed through regulations) as well as an industry that is currently trying to pick up the speed of the digital transformation. We conclude with a set of policy advises that we derived from our work.

[31] Data can be considered a plural form of the noun *datum* or a singular, collective noun. We use the term both ways in this volume, depending on context.

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Data as the gold of the 21st-century? Establishing data markets

– by Jonas Röttger, FINDER ESR –

While previously business aspects of ecosystem management have been addressed, this section dives into an operational point of firms within ecosystems by shedding light on one of the most crucial resources in a digital era: data. Since data as a resource has become a common perspective across industry, this chapter illustrates how data needs to be organized so it becomes a tradable resource on data markets.

Max Tegmark, professor of physics at the MIT, points out in his latest book (Life 3.0 – Being human in the age of artificial intelligence) that "in the future, the only traded resource will be knowledge" because knowledge-driven technology will be able to create all sorts of matter just by reassembling atoms. That sounds far-fetched but even today companies that harvest and utilize data, the precursor of knowledge, are among the highest-valued firms globally. However, you don't see price tags on all the data that is floating on the internet, because markets have not yet developed. I will inform you from an economic perspective why that hasn't and why it actually should.

Of course, already today you trade your data in exchange for services. If that hits you by surprise, I recommend a short reading of the terms of service on your Facebook account (if you *still* have one). Yet, given the margins of big tech companies, the deal could be more profitable for producers and also more transparent. Markets could help to distribute data's benefits more equally and make data trade less opaque.

Researchers at the University of Amsterdam approached the issue of lacking data markets from a scientific perspective. They defined data commoditization and market mechanisms by proposing six data properties that could pave the way for building solid data markets.

1. **Data sovereignty** addresses data ownership. Compared to oil, data, as an economic good, is non-rivalry, meaning that data can be copied and shared infinitely.
2. **Trustworthiness** (or trusted data) refers to data being verifiable and auditable. Data is becoming a decisive element of automated decision-making and therefore it has to be trusted. A consumer at a gas station does not have to check the gas for its quality because all parties involved in the gas value chain have agreed on industry standards.
3. **Data reusability** ensures that data is stored and can be gathered for future projects and applications. Well, oil doesn't do such a great job here either.
4. **Actionability** demands that data purchased by a company is directly applicable to its value chain. Meaning companies should be able to assess the economic gains or savings through data acquisition before purchasing the data. In the oil industry, companies have estimates for the returns they can expect from acquiring a specific amount of oil through a trade market and established value chains.

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5. Finally, **measurability** refers to the valuation of data. There are different approaches to conduct the pricing of data.
    a. First, there is the cost-based method, which is based on the idea that data creation, sharing, storage, and analysis are costly and therefore should determine the price.
    b. Second, there is problem-based pricing where the consumer sets a price and the providers react upon. Current examples are tournaments on data science platforms such as Kaggle.
    c. Also, the price depends on the data quality which hinges on multiple factors. For instance, the number of variables and cases, the precision, the accuracy, the actuality, and the temporal resolution of a data set. In an existing market for data, pricing would be much easier through processes of comparison with similar data assets.

What is the current status across significant industries? A look into the (European) perspective.

Currently, data commoditization is mostly pursued by huge tech companies. As they do both the data harvesting and monetization, there is little incentive for them to engage in the creation of transparent data markets. In Europe, the European Union has set the agenda for the creation of open data markets to facilitate digital transformation. To not fall further behind the curve, industries sitting on huge piles of data, e.g. incumbent banks, should embrace the establishment of open data markets as an opportunity.

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No need to tell - How data silence can speak volumes

– by Jonas Röttger, FINDER ESR –

Data privacy is a hot topic affecting numerous people around the globe – if not every single individual. While the public debate often revolves around the unethical retrieval and use of personal data I am going to shed some light on the societal ramifications of people deliberately sharing their data.

In 2009, Meglena Kuneva, European Commissioner for Consumer Protection at that time, said that "personal data is the new oil of the Internet and the currency of the digital world". Although personal data has become its own asset class and markets for personal data have been developed, it is often traded in grey zones or used in exchange for free services, making its precise valuation complicated.

These days, companies utilize personal data for a variety of purposes: reducing search costs for products via personalized and collaborative filtering of offerings, lowering transaction costs for themselves and for consumers, increasing advertising returns through better targeting of advertisements, and conducting risk analysis on customers.

Let's focus on the last aspect of conducting risk analysis on customers and illustrate its application in the financial industry. For instance, accurately predicting the default risk of a borrower or an insurance policyholder's risk of having a car accident can be a competitive advantage and save you money. But how does this development look from a customer's perspective? So-called usage-based insurances (e.g. Drivewise from Allstate), for instance, are using driver behavior to calculate insurance premiums. Customers who are not willing to share their driving behavior are obviously not amongst the clientele of these insurances and that does not impose a problem at this point. But this only holds as long as there are enough alternative insurance companies that do not require customers to share their driving behavior. However, the market for usage-based insurances is expected to reach a global market size of $115 billion by 2026. Things could change tremendously once insurers and customers realize how much money they can save by using and sharing data. At this point not sharing your data becomes costly and the sole fact that data is not shared already conveys information that could make companies suspicious. What does he or she have to hide?

Going back in history: Germany ratified the "General Act of Equal Treatment" in 2006 which aimed at avoiding discrimination based on race, ethnicity, gender, age, religion, disabilities, and sexual identity. An example is the disclosed information in German CVs: employees do not have to provide any information on aspects mentioned in the General Act of Equal Treatment. However, equality is only ensured if all applicants follow the recommendations and do not share this information in their application. There lies the rub: people who can expect favorable treatment by a system (positive discrimination) could be more forthcoming and willing to share their data, whereas people who have to fear a negative treatment (negative discrimination) could be more likely to withhold it.

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But if a critical mass is sharing its data, data privacy-sensitive people might be caught between a rock and hard place because of the phenomenon called information unraveling. Meaning the information disclosure of others pushes you towards disclosing your information if you want to avoid negative discrimination.

The following is an example of information unraveling told by Prof. Ben Polak during his lecture on game theory at Yale University. He describes that the hygiene in restaurants in Los Angeles in the 1990s had become so alarmingly bad that the government introduced a new quality control that checked the restaurants and distributed health certificates from A to D. Despite the fact that companies were not obliged to display their certificate to the public those restaurants receiving an A started to put their certificate in the window. What did this do to the other restaurants? Well, those who received a B started hanging up their certificate because they did not want to be considered only having a C or D. Guess what C-certificated restaurants did? They followed the logic of B-certificated places and hung up their certificates as well. Only those receiving a D did not engage in the practice of showcasing their certificate. However, from a customer's perspective, the interpretation is clear: if you do not show your certificate you are most likely part of the lowest assessment and therefore, not a good place to dine. By the way, information unraveling is only effective if the receivers know about it. Tourists usually did not, which made displayed certificates ineffective in touristy areas.

So where does this leave us? The bottom line is if people are sharing their data deliberately it can start cascades of information disclosure that make markets extremely efficient. However, it also holds the potential to discriminate against people who are not willing to share their data. So, while the public debate has been revolving around protecting customers from companies harvesting and utilizing personal data against their will, the debate on which data companies are not allowed to use despite the customers' consent should get more attention. Evidently, that debate is a very industry- and service-specific discussion but one that has to go with the current developments.

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How banks should harvest their internal data

– by Jonas Röttger, FINDER ESR –

Data fuels decision-making. Banks are well-equipped with the financial data of their customers. Experts often point out that consolidating internal financial data with other data sources (e.g. behavioral data, macro-economic data, etc.) will unfold data's full potential. Yet, banks' rich internal data is regularly overlooked as an opportunity that can be used to fuel decision-making. Banks need a solid data-gathering strategy and advanced data analytic skills to leverage their internal data.

How should banks approach internal data?

Data needs to be gathered with a clear purpose. Hence, the journey towards a data-fueled operating model starts with defining clear use cases. Subsequently, the use cases have to be checked against reality. Therefore, banks' internal data should first be inventoried and categorized. It is crucial to define a timeframe for which data collection is performed (depending on the use case, data collection for the last three to ten years could be most suitable). Subsequently, the data can be put to work through e.g. model-building. While harvesting data with the goal to implement use cases is crucial, the strategy should also entail how to manage data in the future. Harvesting data from legacy architectures demonstrates the potential of data in general but is very inefficient for future endeavors. Here, breaking down data silos and building data lakes represents a robust solution. Currently, banks are still struggling with small projects that only reach the proof of concept stage and large projects that are abandoned due to overwhelming complexity. Incremental progress on mid-complex level projects represents the largest potential to strive.

Too much of a good thing: why data frugality is important

Occam's razor is the idea that in problem-solving, the simplest solution is usually the right one. This approach is well-adapted in data science for several reasons. Firstly, a model's appetite for data increases the risk of having unobserved data points which negatively affect the predictive power of a model. Secondly, more data increases the training time for models. More training time means more energy and consequently higher costs. Thirdly, more data can lead to impaired explicability of a model as a complex model's results are harder to interpret. This is especially the case if deep learning methods are applied (which remain to a large extent black boxes). The low explicability of models prevents their application as part of automated decision-making due to GDPR regulations. Moreover, low explicability could make the model unstable in times of new hitherto unseen data. Users will have difficulties to explain why and with what accuracy the model is adapting to the new circumstances. In general, striving for parsimony is an important criterion for which banks have to optimize when using their data.

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Keeping data in the loop

Oftentimes, it is argued that data evolves from simple data to information to knowledge. While that is true for many use cases, it should be pointed out that data-fueled decision-making does not always require intense computation to become knowledge. Depending on the level of human-in-the-loop or the affordances of a decision, very simple data points can be highly informative. However, if data is processed in a time-consuming and complicated manner to derive knowledge (e.g. in the form of a report), this knowledge should be kept in the loop. Hence, the results of data processing should become part of the data storage.

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Building convenient and individual data privacy to create customer trust

– by Jonas Röttger, FINDER ESR –

Customer data belongs to the most sensitive and valuable data a company possesses. While the previous section talked about how to assess data's tradability, this chapter talks about how to get access to customer data by adopting a customer-oriented privacy set-up that enables convenient and private interactions.

Data has become a ubiquitous term that is discussed as a core asset for companies. Organizations need data to develop new business models, fuel their services, and hence, stay competitive in a world, flushed with information.

But how to balance data harvesting and preserving privacy? Companies should strive towards building convenient and individual privacy to ensure customer trust.

Where do companies stand?

Data privacy is perceived as something that is under constant threat by companies. However, most data-harvesting organizations cannot be accused of operating outside country law. Perceived violations of privacy, as an intrusion into seclusion, are rather emerging from harming social norms than actual contravention of the law. This is what research has described as creepiness: you know that Facebook can target tailor-made ads to your current desires. This is not illegal but still feels, well, creepy. Eric Schmitt, the former CEO of Google, as an example of a particular data-hungry company, even once said that the company strategy was to design services on the edge of tolerated creepiness. The perceived creepiness often arises from a lack of understanding of the ramifications of sharing personal data. Therefore, the question prevails on how to empower customers so that they become aware of the negative and positive implications of giving up privacy?

Informed consent is only the first step

While regulatory endeavors are pushing transparency into how companies are using personal data, this is often limited to informed consent. Yet, there are two problems associated with informed consent.

First, customers might not possess the time or expertise to understand the ramifications of data usage provided in the privacy agreement. For instance, if an average user was reading all privacy agreements he or she encounters over a year, they would need seventy-six working days to do so. Moreover, it is difficult to calculate the harm that can be done with the exposed data, as non-personal data can become personal through merging it with different data sources, let alone the opportunities of data usage that are far from being fully explored.

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Secondly, it is often practically impossible to opt out of invasive data gathering by companies without effectively opting out of society and human contact. Imagine the community of your favorite hobby organizes themselves on Facebook or WhatsApp. It will be difficult to convince everyone to join a more privacy-preserving service if the current platforms are well-established, extremely convenient to use, and overall cost-free. Consequently, individuals face a trade-off between excluding themselves from society or giving up privacy. This explains the prevailing privacy paradox: people are concerned about data privacy but are not acting accordingly. Not because they effectively do not care but because it is really hard.

Convenient and individual privacy

The idea of convenient and individual privacy is based on two main principles. First, companies have to strive towards full transparency of data usage and present it in an understandable format to customers. In a world that is striving towards customer-centricity and convenience of services, it is remarkable how complicated and blurry privacy terms are still formulated. Secondly, customers have to be able to select their personal level of intrusion. The willingness to share data might not be equally distributed among society. Some individuals might weigh the benefits of giving up privacy stronger than others and are hence, more likely to accept a higher level of intrusion. Achieving convenient privacy will lay the foundation for establishing trusting relationships with customers. Trust, as a key enabler of commerce, intimacy, and free expression, enables customers to safely disclose personal data in long-term relationships. This unique data can lead to unique services, which makes convenient privacy an enabler for building competitive advantages.

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What is preventing incumbent banks from monetizing their data?

– by Jonas Röttger, FINDER ESR –

Banks are often described as possessing a huge pile of customer data but being unable or unwilling to leverage it. We confronted five industry experts with this statement asking what is hindering banks to monetize their rich data reservoirs? Here are their answers and recommendations on how banks could overcome them.

IT legacy – banks' IT systems are not in shape to allow state-of-the-art data analytics

An often described hurdle to leverage data is the IT legacy system of incumbent banks. While the mere size of the data banks own could be a rich resource, the IT systems are not (yet) consolidated data pools that can provide information. Even in collaboration with Fintech companies that developed efficient algorithms to perform smart data inquiry, implementation often fails after a successful proof-of-concept stage. The data is not structured and stored in ways that allow for relevant and timely data consultation. So, where to start?

The unique data of banks are spending data. An expert recommendation is to stratify spending data according to customer demographics for a time horizon of the past five years. Some experts recommended that effective and efficient usage of data would only be possible if banks were building new systems from scratch and migrating carefully selected data (e.g. the last five years) subsequently.

Talent turnover – culture and demands are not attractive for young high potential IT workforce

Banks' IT systems display opportunities for young and ambitious IT workers: they are embedded in huge and well-paying organizations and require plenty of work. While banks communicate externally that they are particularly looking for IT employees with a disruptive mindset the reality is often very different: a highly regulated and risk-aversive culture is skeptical of incrementally built and improved IT solutions. No IT system is released flawlessly today. Systems are optimized, catered towards customer needs, or improved in terms of security standards while they are already in the market. Banks expect a bullet-proof solution from the get-go.

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In addition, banks are not particularly interested in functionality that does not yet have a clear use case. Industry expertise is needed in combination with data analytics skills to develop promising use cases that appeal to strategy-setting executives. This represents a key to stretch banks' risk-averse culture and provide young IT employees with interesting challenges.

Value chain positioning – highly-regulated back-end vaults vs. life-fulfillment platforms

Big tech companies are entering the financial services market. While companies like Apple and Google are partially interested in gathering access to spending data via financial products, their main interest is to extend their portfolio by yet another revenue stream. However, because of their data analytics skills and their business model, tech companies can offer a level of convenience and pricing (e.g. freemium) banks are unable to provide. The question is whether banks are willing to play the role of highly regulated institutions that manage the back-end of financial services while tech companies will own the customer relationships?

Tech companies are increasingly becoming targets of supervising and regulatory bodies (especially in Europe) and it is at least unclear whether they are motivated to become as regulated as banks. This represents a competitive advantage for banks that are very familiar with striving in the regulated environment.

Moreover, if banks do want to act proactively defending their customer relationships, data analytics are necessary to design platforms that offer financial services that go beyond today's banking products. A banking platform should provide internal, external, and integrated financial services that facilitate everyday life (e.g. buying public transportation tickets) or rare life-changing financial decisions (e.g. buying own property). The challenge is that not every bank can turn into a platform, given that platform economics usually represent natural oligopolies.

Data monetization can be direct or indirect – which path to choose?

Direct data monetization refers to trade data in exchange for value, whereas indirect data monetization refers to using data to enable, improve, or maintain revenue streams (without trading data itself). While trading data could be lucrative for banks on a short- to midterm scale, it could also jeopardize their reputation as highly entrusted institutions. Hence, pursuing indirect data monetization by using customer data to design tailor-made solutions seems to be the golden route. However, for services and solutions to be highly relevant in content and timing, banks still have a long way to go.

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Life-fulfillment platforms as the future of customer-centric retail banking

– by Jonas Röttger, FINDER ESR –

The trend towards hyper-individualization of services is affecting retail banking. Retail banks can transform to become gateways into various ecosystems. Thereby, managing all value exchange across industries. Data is the fuel for all know-your-customer applications. Therefore, retail banking needs solid strategies on how to use and protect customer data to enable value creation. This whitepaper offers strategies and models on how to approach this transformation.

Part 1: Introduction and methodology

Value exchange is at the core of every transaction. Banks can develop into one-stop-shops offering client-centric solutions that connect eco-systems to facilitate transactions across industries. The question is where to position a bank and which role to fulfill? We interviewed various industry experts from retail banking, payment processors, Fintechs, and technology integrators to develop a vision for the future of customer-centric retail banking which we call "life-fulfillment services". This paper describes how banks can transform from offering core financial services, beyond banking (i.e. integration of financial services and products in new industries) to life-fulfillment services.

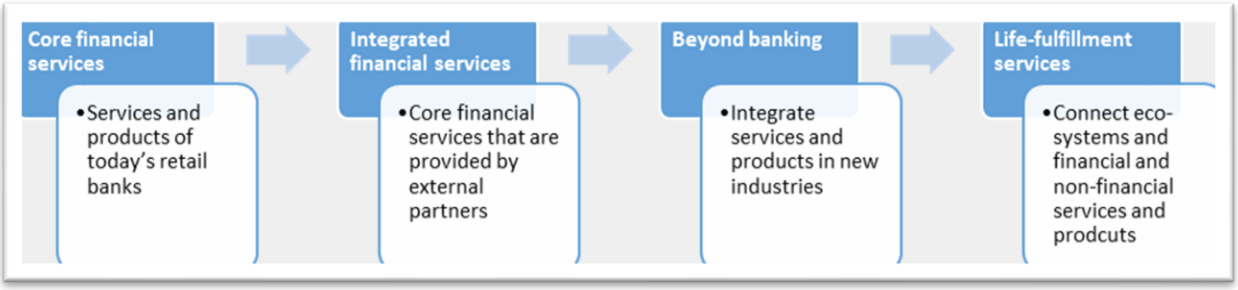

Figure 1 From core financial services to life-fulfillment services

After describing the future business model for retail banks, we will dive into how data represents the key enabler for the underlying operating model. Finally, we will advise on how banks can activate internal and external data sources.

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Part 2: Banking transforms into life-fulfillment services - The need for customer centricity

The customer experience created by tech companies such as Google and Amazon is setting the benchmark for all B2C interactions. Customers are increasingly seeking similar levels of customer experience in all services they use. This development is putting pressure on all industries that have customer-facing services, including banks. Especially, the convenience of services, meaning the state of proceeding with something without experiencing difficulty, that tech companies offer represents a challenge for banks. Customers will become progressively less forgiving to violations of convenience and perceive them as obstacles towards their goals.

However, customers not only expect convenience when they are looking for a specific service, but they also appreciate if companies support them overall in making better decisions. Recommendation systems help customers to navigate complex environments and to illuminate paths that might be meeting the underlying customer need. For instance, Amazon recommends the fitting wall mount for a screen that has been added to the shopping basket. In banking, customers might need to move to a bigger home. However, while today banks would offer mortgages if approached by the customer, future banking will detect the customer's need (i.e. need for a bigger home) and work towards offering all products and services to support the customer reach her goals.

Scenario 1: the customer needs a larger home

The customer is faced with a new life situation that requires her to look for a more spacious home. While traditional banks would provide mortgages and financial information for landlords upon customer request, customer-centric banks will advise customers on multiple options, predict ramifications and recommend solutions.

Figure 2 Offering and suggesting the best solution for the customer's need- life-fulfillment puts the customer at the center

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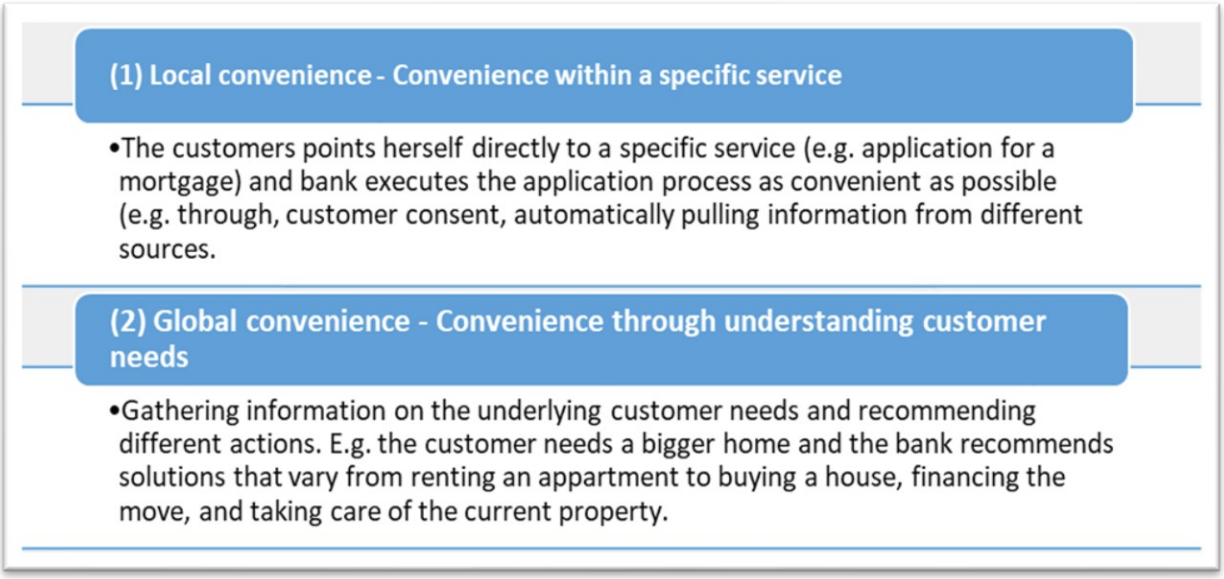
Convenience is at the core of customer experience – From local to global convenience

Putting convenience at the core of the customer experience increases the usage of the product and the conversion rate (i.e. fewer people stop using the services because they do not know how to continue, feel overwhelmed, or do not trust the information provided). Convenience facilitates the sensation of flow. The customer has a specific need and the service is designed in a way that leads him or her directly towards fulfilling these needs. While convenience is usually limited to the usage of a specific service, it can also be created by foreseeing customer needs. Hence, while the usage of each service should be convenient (i.e. local convenience), convenience on a global level is achieved through recommending services and products based on holistic customer needs (see also Scenario 1).



Two forms of boosting convenience: local and global convenience

Figure 3 Convenience of services is important, for both services selected by the customer and for deriving services based on the customer's needs

Part 3: The life-fulfillment services – Connecting eco-systems across industries

Life-fulfillment services mean on the most advanced level enabling customers to achieve every goal in life through a one-stop-shop solution. From a midrange perspective, it means connecting eco-systems to offer services that cover the entire value chain of complex real-life use cases (e.g. the need to move to a larger home). Therefore, life-fulfillment services cover all financial interactions of customers with various ecosystems (see below).

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Figure 4 life-fulfillment services - the bank can take on different roles to connect the customer to various ecosystems

The future roles of retail banks

Retail banks can fulfill different roles in providing services to their customers. Meaning that retail banks can decide which role they want to play concerning specific ecosystems.

Banking as an initiator	In cases where the bank offers direct access through bank distribution channels to specifically supported externally sourced services or products, the bank acts as an initiator. The bank platform is used as a channel (vs. aggregator being part of their revenue model). Examples include a real estate valuation by a certified inspector, a bus ticket, a solar panel installation, or an investment.
Banking as an advisor	Where the bank consults the customer on what to do, when to do it, how to do it, and with whom to do it, the bank acts as an advisor. The bank becomes the tool for the clients to make decisions. Examples include determining which house to buy taking into account needs and affordability, choosing between transportation options, making business investment decisions, and preparing for retirement.

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Bank as a facilitator	As the bank provides, orchestrates, and curates a platform for different stakeholder groups to not only find each other but also interact and transact, the bank acts as a facilitator. The Bank offers marketplaces, providing platform integration. Examples include bringing together garden maintenance businesses with bank clients, charities with donors, car dealers with car buyers, or hotels with vacationers.
Bank as an aggregator	The bank will act as an aggregator when it **will package and integrate homegrown and third-party solutions** to offer a holistic or end-to-end service. Examples include a house selling service that includes valuation, brokerage, bridge financing, and moving service, or a heating-as-a-service solution that includes installation of a new heating system, maintenance, repairs, a utility contract at a monthly fee over 10 years.

Banks have to cover all key-value stream at any place and time

The interaction with the ecosystems are organized across the four key value streams (see Figure 5). Covering all value streams is important to create life-fulfillment services that support customers at all times.

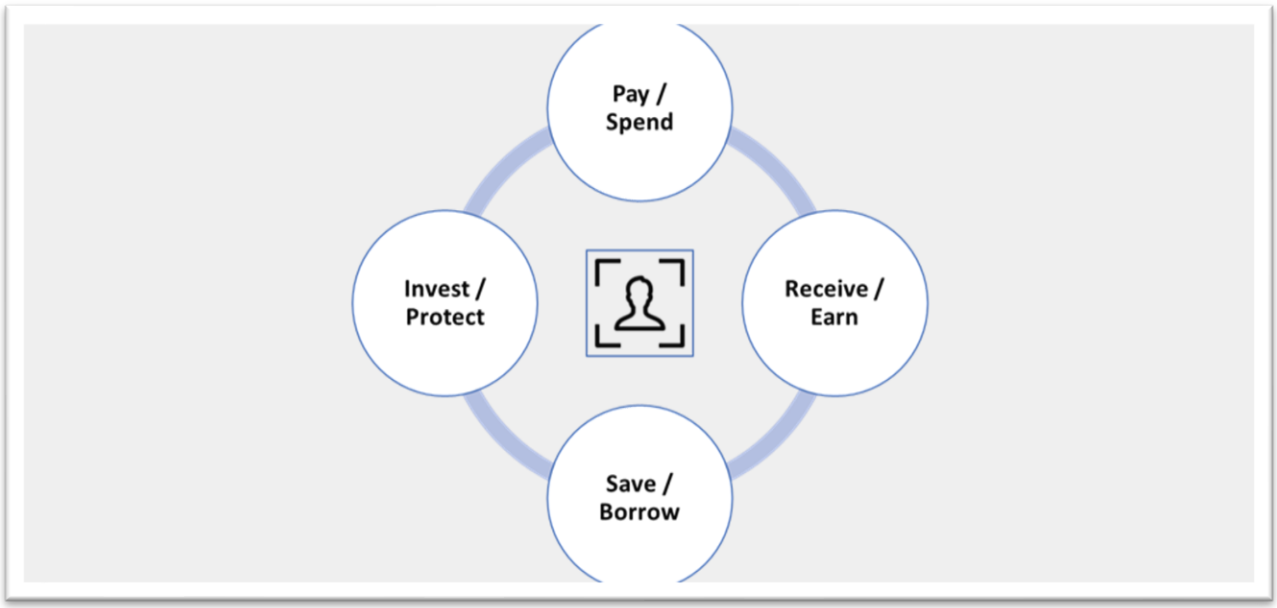

Figure 5 Four major value streams that banks will have to cover at all time to strive

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Pay/ **Spend**	As people are going about their lives (consumers) or legal entities are going about their business (commercial ventures), they interact with third parties to receive products/services they need. The financial systems in place offer secure and convenient payment solutions that fit the context (remote, in-store, …) and conditions of the transaction (amount, payment terms, …).
Invest/ **Protect**	People need to secure their ability to meet and finance their future life needs, by securing long-term acquisition or spending plans (e.g. child education, retirement) while protecting them from important/unexpected expenses that would endanger those plans. Financial services will facilitate the preparation of those plans while protecting the current state.
Receive/ **Earn**	Most people depend on both recurring and discretionary income to finance their lives. Businesses do the same to fund their operations. All depend on financial services to receive the payments they are entitled to and to subscribe to payment solutions that fit the context of the payment transaction (e.g. salary receipt, real estate sale, retail transaction) and the associated amounts. Any sale or rendering of service requires to securely take receipt of the matching monetary compensation.
Save/ **Borrow**	People and businesses will experience and anticipate deficits/surpluses as they pay for acquisitions, services, and operations. Financial services will provide a secure value store for surplus funds to potentially use in the near future or lend money to fund short-term spending, thus supporting their customers in both their lives' day-to-day and their milestone decisions.

Part 4: A data-fueled operating model is mandatory for any role a bank chooses

To leverage data for decision-making, it has to be informative. That means that data has to provide incremental insights to the current state of understanding of a specific situation so that decisions can be made, reconsidered, or confirmed in a well-founded manner. Banks should use data to empower customers to make good decisions. Therefore, banks require data analytics capabilities and data to fuel their analytics. While banks have rich internal financial data, connecting to external parties is core to having a full overview.

Financial data	Other personal data	Behavioral data	Peripheral data

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• Socio-demographic profiles • Wealth • Economic risk level • Financial relations • Income • Transactions and interactions	• Personal preferences • Technical preferences • Concentration of accounts at other institutions • Household	• Online and offline behavior (e.g. location) • Purchasing preferences • Attitudes	• Regulations • Economic factors • Weather and seasons • Trends / recommendation
Natural Ownership	External	External	External

A new data paradigm is needed to strive – The data-fueled operating model for customer-centric retail banks

Data needs to be at the core of the operating model of every bank that wants to serve tailor-made services to their customers. Being able to gather customer data (and other data), analyze it, and put it to work is the foundation of knowing your customer. However, knowledge is only at the top of the data enriching process and requires digitalizing data, combining data, and contextualizing data. Still, along the enriching process, insights can be derived for decision-making and services that need a lower level of data processing to be informative. The data-to-knowledge pyramid model visualizes how data is processed to create actionable knowledge. It also demonstrates which insights are produced along the data-enriching process.

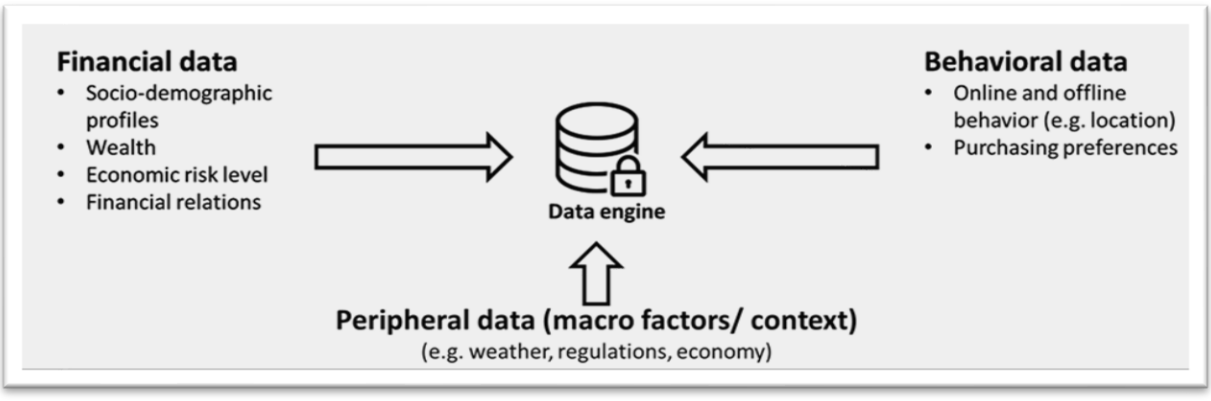

Figure 6 Using data enables banks to know their customers' needs.

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Data-to-knowledge – increasing value derived from data through enrichment and analysis

Data fuels decision-making. In fact, decisions based on solid data are more likely to yield the expected results. However, data needs to be in the right format to be informative for specific decision-making. Enriching and processing of data increase the level of insight and the value that can be derived from the value. Both additional data sources and enhanced data analysis capabilities are required to boost value.

Level of insight	Explanation	Data examples
Knowledge	Know-how, understanding, experience, insights, intuition, contextualized information	Future customer preferences
Information	Contextualized, categorized, calculated, and condensed data	Customer lifestyle
Digital data	Facts and figures which relay something specific, but which are not organized in any way	Digitalized customer financial data
Non-digital data	Paper-based documentation	Customer offline behavior, non-digital documents

Part 5: A data activation strategy

The data flower model paves the way towards activated data.

To use data for value creation requires having it in a usable format, consideration of data ownership rights, and protecting it from unauthorized access. The data flower model considers these four dimensions and how they relate to each other.

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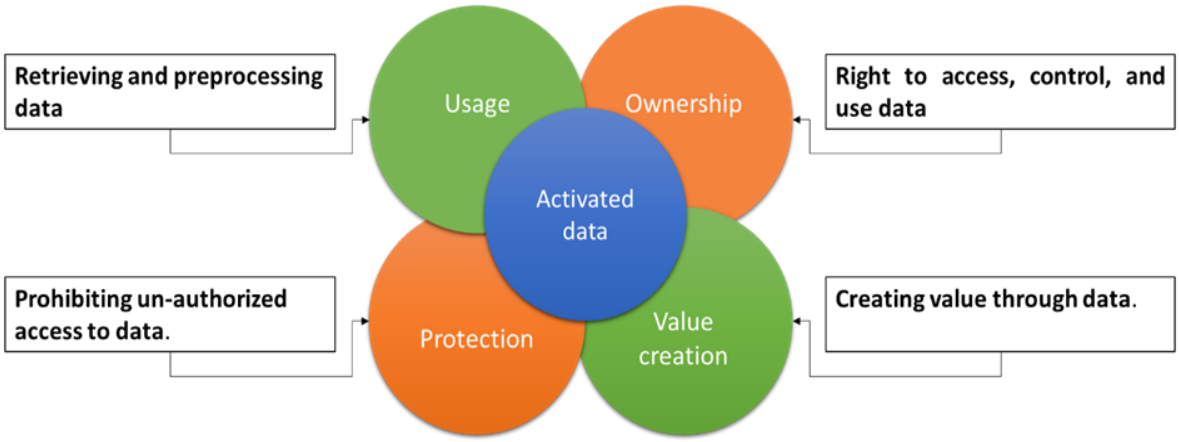

Figure 7 The data flower model visualizes how the four core dimensions of activated data relate to each other. Performing on all four of them and understanding their relationship is necessary to change towards a data-driven operating model.

Element	Definition	Description
Ownership	Right to access, control, and use data	A data-fueled operating model for banks requires the option to use customer data on various occasions. However, banks should state clearly for what purpose customer data are collected and how it is used. While this represents the regulatory requirement banks should move beyond this benchmark and set customers in full control of their data. That means customers can easily grant, deny, and withdraw controlling rights to their data conveniently. Convenient privacy is a component that banks should make part of their target customer experience.
Protection	Prohibiting unauthorized access to data	Customer data can be sensitive and needs proper protection against unauthorized access from both outside and inside the bank. This represents a regulatory requirement (e.g. GDPR) but also a prerequisite to maintain customer trust. Customer trust around data security and privacy is crucial to have customers share their data with the bank. Allowing customers to disclose data in exchange for services in a trustworthy and secure manner represents a key competitive advantage. As new and exclusive data can fuel new and innovative services.

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Usage	Retrieving and preprocessing data	Data usage encompasses dependent dimensions. Firstly, a need for the demand for data to enable or improve a use case that contributes directly or indirectly to value creation (see below). Secondly, availability, storing and managing data to be used for analytics and business processes. Hence, data usage means usable data in the sense that it is needed and that it exists (in an applicable format).
Value creation	Creating value through data	Value creation through data can be achieved on multiple levels. In general, value creation can be divided into direct and indirect effects. While direct effects refer to the monetization of data through trade, in-direct effects refer to improved KYC capabilities, increased marketing conversion rates, better risk management through more accurate credit scoring, etc.

The data flower interdependencies

Data usage and value creation have to respect data protection and ownership.

While data usage and value creation represent clear opportunities, data ownership and protection are the required prerequisites that banks have to incorporate if they want to leverage data. In the following, the interdependencies between the opportunity and regulatory dimensions of the data flower model are presented.

Protection and usage	Data protection has to be tailor-made for the various steps of data usage. On its development from data to knowledge, data needs to be protected against different forms of unauthorized access. For instance, referential raw data that is anonymized requires different forms of protection compared to the knowledge that is shared with clients or information that is further processed by external parties in the ecosystem.
Protection and value creation	Value creation and protection go hand in hand for multiple reasons. Firstly, as a regulatory requirement and trust-enhancing component protection needs to be guaranteed at all times. Secondly, data is non-rivalry, meaning it can be copied infinitely, and hence, data breaches impair value creation because banks lose their competitive advantage (i.e. unique data).

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Ownership and usage	In the long term, customers should be in full control of their data. This means they control access rights to their data in real-time conveniently. All retrieval of new data and some analysis require customer consent. Hence, the processing of data in terms of data usage is directly linked to data ownership.
Ownership and value creation	External parties may process customer data to enable value creation. Therefore, the data control rights have to be either transferred or technology is used to create anonymous data exchange between parties. Banks should embrace solutions like privacy-preserving machine-learning technology. Moreover, anonymized data insights and trained machine-learning models can be traded or offered for remote applications. These techniques enable value creation while respecting ownership rights.

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Different data gathering strategies – Data can be acquired internally and externally

1. Gather internal data – How banks should approach the data in their internal systems

Exploration	Inventorying	Create an overview of what is there. That requires having a clear focus on how far back you want to go into archival data. This needs to be clearly defined before inventorying.
	Prioritize	Define which data you need to implement the most promising use-cases (based on what you expect to find in your internal data). Thereby, managing costs in an efficient manner.
	Categorize	Naming data and making it retrievable and understandable for future endeavors. New projects will profit from the compounding effect of clearly named and categorized data.
Preparation	Consolidate	Different data points can confirm each other. Consolidating data sources sets the first step towards trustworthy data sources. Especially, internal data silos can be a fruitful source for data consolidation.
	Cleanse	Data comes in various shapes and forms, such as unstructured data (i.e. text, audio, and video), semi-structured data (i.e. machine-generated, XML), and structured data. Cleaning the data so it can be used for further processing represents a challenging but necessary task.
Storage	Store	The data preparation process must be documented and stored so it can be used by data analysts and developers.

2. Connecting to external data – Banks are well-equipped to be the client-facing entity in the web

Beyond using what banks have in stock, reaching out to external entities is necessary to get from data to knowledge. The Payment Services Directive 2 (PSD2) has set the ground for collaborating with various partners in the financial services industry. Building APIs and opening the IT infrastructure for collaboration is both an opportunity and a threat for banks.

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However, while banks might have feared being replaced, today's data shows that collaboration between banks and new Fintech players is the most common modus operandi. Banks have a huge advantage when it comes to deciding who is going to be the client-facing entity in a life-fulfillment services platform because of the wide trust they experience across customers. Banks should play out this advantage and own the customer relationship.

3. Gather customer data – There are various methods to obtain customer data

There are different forms of customer data and different strategies to unlock it. In the following, various data-gathering modes are presented. Not all data needs to be directly collected. Increased data analytic capabilities can be leveraged to infer data. That means that proofed correlations are known that can be used to derive insights. These insights can also be shared with customers as an information service. Moreover, external parties should be accessed to gather additional data. Consequently, APIs represent an important technological capability that banks should invest in.

Data-gathering mode	Definition	Banking example	Strategies to unlock
Volunteered data	Explicitly provided by the customer	Demographic data, self-reported income	Contracts and surveying
Observed data	Created through customer activity	Transaction history	Data analytics
Inferred data	Proprietary forecast using other data types	Underwriting output, customer profiles	Data analytics
Third-party data	Purchased by institution	Credit scores, background checks	APIs

Policy advice

Regulations have given the banking industry a strong push to innovate through collaborative partnerships by releasing directives like PSD2. However, while it is clear to see that these directives were designed with data as a leading principle, there are still gaps to close, both to protect customers and allow fruitful entrepreneurship in the financial services industry. We have gathered three key recommendations where we see substantial potential for further improvements.

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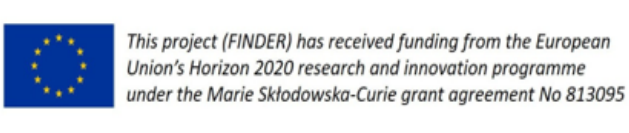
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With data being such a crucial factor for innovation in a digital era, it stands to reason that norms and regulations accompanying these technological developments, need to be (put) in place. Did this chapter dive into the micro-level perspective, the following chapter will elaborate on the instances that are setting norms and regulations in place for a sustainable digitalization.

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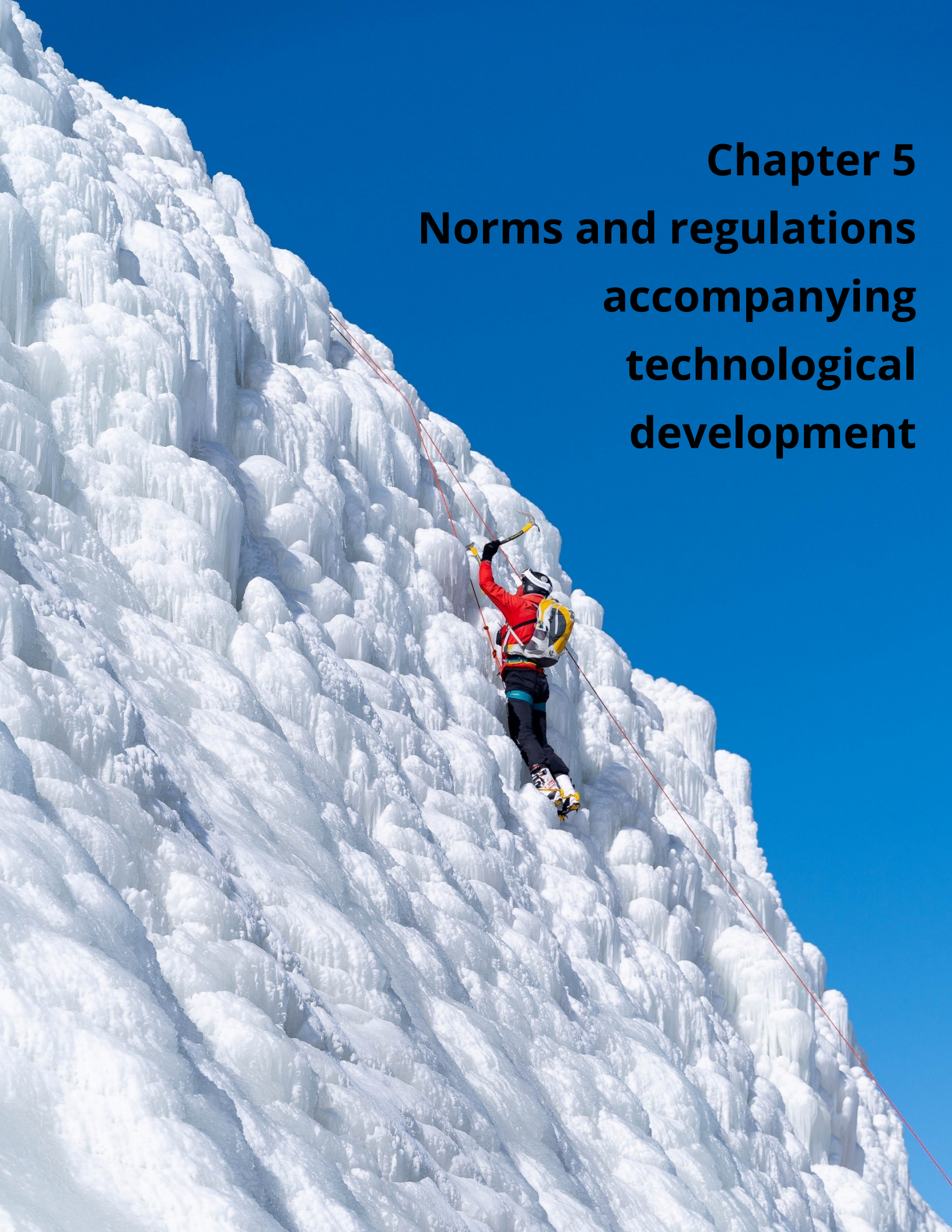

Chapter 5
Norms and regulations accompanying technological development

Data is a logical point of departure as it provides the fuel for digital transformation. With this chapter we extend this micro-level perspective by introducing a necessary meso-level: norms and regulation and we touch upon the role of both actors from the industry as well as regulators as instances that are setting norms and rules for a sustainable digitalization thereby channeling the transformation. While there is a shift in how a directional example open banking is introduced to showcase that regulators can give directions for necessary change, it is companies that further define and implement such change. While highlighting positive developments, Future for blockchain also sheds light on existing shortcomings regarding the temporal carrying capacity of regulations - if existing - as well as the development and adaptation of novel technologies as room for further exploration and experimentation are underutilized. This chapter provides insight in how implementation and development of norms are defined by practitioners as well as customers who decide which innovations are pursued.

Open Banking, an opportunity within grasp

– by Jonas Geisen, FINDER ESR –

Open banking is the future of Fintech. However, what open banking specifically refers to and how it plays a role in Fintech requires us to have a more comprehensive understanding. Below, we introduce open banking and how it plays an essential but more agile, customer-friendly role in the Fintech community.

On 05.11.2020 we as FINDER ESR's tuned in into the Open Banking Summit held by the Commerzbank[32] in cooperation with the Business Engineering Institute St. Gallen. In this section, we will have a look into the Summit's key notes to see how the realization of Open Banking is progressing based on this use case, which opportunities may arise, and which challenges are still to face.

Open Banking became more prominent in 2016 when the United Kingdom announced its Open Banking Standard and the European Union published its Revised Payment Services Directive (PSD2). However, it only gained momentum in 2018 when these drafted legislations came into effect. Simplified, these laws require banks to open up their IT infrastructure. Technologically, this is done through application programming interfaces (APIs) which allow different IT infrastructures to communicate with each other. In the case of Open Banking, APIs enable third parties to connect to banks' existing IT infrastructure and thereby access and usage of the data gathered– the ambition is to say bye to data silos guarded by banks.

The backbone of the Summit was a whitepaper The Future of Collaboration in Corporate Banking, in which Joerg Hessenmueller (Commerzbank AG) defined:

"API [is] a crucial technology that enables communication between IT-systems with enough flexibility to address the complexity of today's world [based on] closer collaboration among different parties leveraging on their different capabilities to create value for the customer".

Resulting from that, one can understand David Kauer's (PostFinance AG) conclusion that:

[32] Disclaimer: The content of the FINDER blog is not an expression of Commerzbank AG, nor created on behalf of Commerzbank AG. The content is created and contributed by private persons.

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"Open Banking is a fundamental strategic and architectural question. Banks do not just do Open Banking – Open Banking is a framework that requires a 360-degree view of business and corporate clients and their needs. Banks, thus, have to decide wisely about the order of actions they take to follow such an approach.".

So what has been achieved so far?

As the use case of Commerzbank depicts, cooperation is key to identifying and leveraging available options. Slowly, new networks are emerging and first attempts of opening up are being made. So far, however, these are still in their infancy. An example is the developer portal. This sandbox provides developers the documentation and option to play around and get used to the APIs provided by Commerzbank. When having a look at the opportunities and challenges, it is, however, clear that this is only a small first step in the right direction.

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What are the outstanding opportunities?

The approach envisioned by the PSD2 is to fundamentally change banking in the European Union. Its implementation is aimed to enhance the value proposition of financial organizations. The basic framework is set to achieve a higher degree of cooperation and co-innovation between banks and third parties, for example Fintechs. This is highly dependent on the abilities of banks to think beyond their organizational borders. If this outward-opening is happening, the most valuable opportunity can be realized:

Building a new digital ecosystem marked by new business models and driven by customer expectations.

Such an ecosystem would be technologically enabled through the opening of banks APIs. Cooperation for innovative ideas could facilitate user value by enhancing consumer protection and security of internet payments as well as account access within the EU and EEA. Accordingly, the opportunity for customers is access to enhanced services within one digital ecosystem. Such services would greatly enhance banks' attractiveness by increasing their value proposition. At the same time, Fintechs have the opportunity to grow by getting access to a greater market reach or even interfacing between bank and customer, being so to speak Business-to-Customer (B2C). Another actor in such an ecosystem would be BigTechs, established technological incumbents like Oracle, which could take a role as technological orchestrators. In that case banks would probably occupy the Business-to-Business (B2B) in such a Business-to-Business-to-Customer (B2B2C) banking ecosystem. To not be pressured into the role of an anonymous back office service provider, banks have to seek a pro-active role. So in general Open Banking should not be understood as a threat or zero sum game by banks but instead as an opportunity. In that sense all actors would profit in the banking B2B2C ecosystem.

Which challenges is the industry still facing?

The transformation, however, is still facing challenges that need to be tackled for such a digital ecosystem to emerge. As the banking sector will open up for everyone, offering financial services a mind-set of collaboration is of importance. Customer centricity should be the focus flanked by provisioning of the necessary infrastructure – for example in innovation labs. An optimal setup is completed by a bank's readiness to identify partnerships and then leverage resources to seize the presented opportunities.

Technologically there are still some hurdles that hinder the facilitation of a collaborative approach to adapt to structural change. Technological readiness is one challenge to face. The adaptation of key technologies across the industry differs strongly and may, in the current state, make collaboration more difficult. Tightly connected to this is the missing standardization of APIs. Heterogeneous architectures for the same services are making fast and approachable cooperation across organizations fairly difficult.

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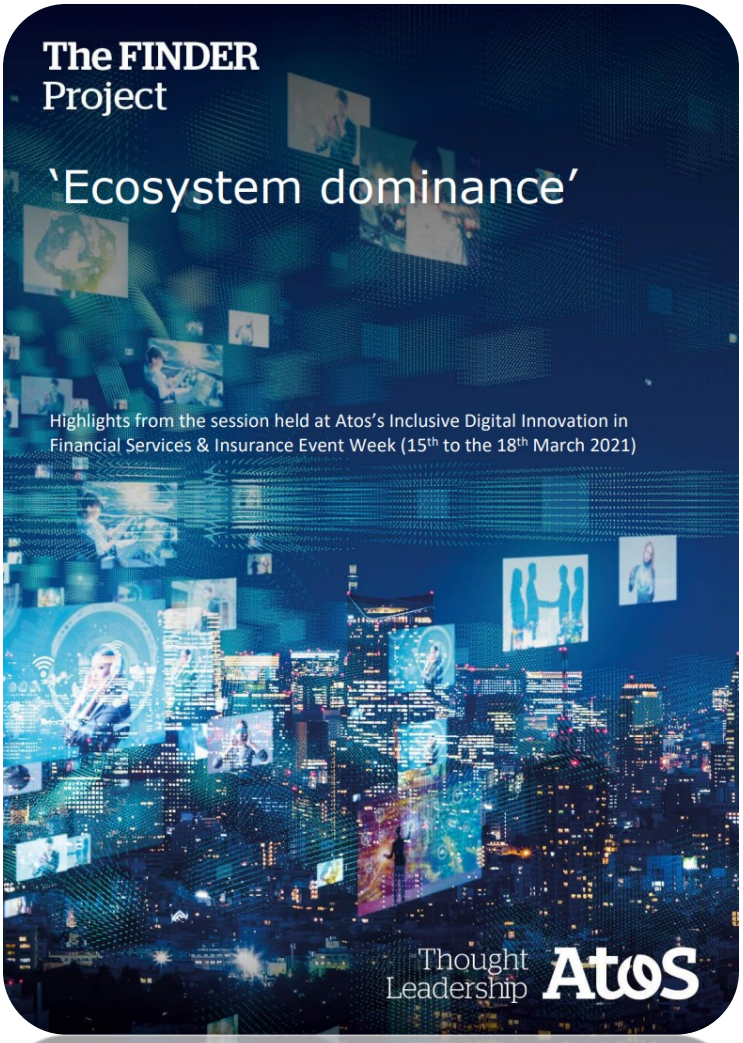
The future will show if all potential actors can overcome these challenges and thus provide the necessary prerequisites to foster an ecosystem marked by innovative ideas combined with industry-specific know-how.

In further layout the FINDER team has developed the below whitepaper on Ecosystem Dominance that is accessible via the FINDER digital resources portal (www.thefinderpoject.eu) as background reading to this chapter as well as to chapter 2:



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Open Banking: the future landscape

– by Ivo Luijendijk, Global Industry Director Financial Services & Insurance, Global Blockchain Director and member of the Atos Scientific Community –

So what happened recently in the Financial Services industry, with regard to new players in the market, Fintechs, who are innovating the industry on top of the established infrastructure, which is carefully built, maintained and guarded by the banks and legislators? Let's take a step back and look at the mechanics behind this change, starting with Open Banking. Open Banking is the new banking business model, that came to be due to the activation of the Second Payment Services Directive (PSD2). Due to PSD2, banks are required to give any third party access to use payments data and launch transactions from a customer's bank account, subject to the account holder's permission naturally.

Getting the measure

Although the range of possibilities and changes around Open Banking may sometimes seem confusing, essentially, they fall into five key categories.

The first category is payments. PSD2 gives merchants direct access to consumers' bank accounts to take payments, thereby diverting transaction fees (which can be up to 3%, or even more, of the cost of products) away from the chain of banks, credit-card companies and payment processors and onto the merchant's bottom line (or passed onto the consumer). Merchants will start leveraging the benefits of this in the next two years, with some – such as ticket-sellers, online retailers, and transport operators – growing and diversifying what they choose to sell.

The second is cash management. Given that most small- and medium-sized businesses hold accounts with at least two banks, these new services will offer to dynamically manage and optimize their cash flow between accounts – something that previously was only extended to corporate customers. So, if a business signs up with four or five banks, its money will be automatically moved between these accounts by one intermediary to avoid overdraft fees, maximize the benefits of interest rates and so on.

The third category addresses loans. Any business with money to invest will now be able to extend loans based on the ability to access the borrower's bank account to assess risk and then regularly monitor cash flow. In exchange, lenders can offer more favorable interest rates. Perhaps the third most disruptive change, this could create new loans markets and ramp up competition.

Fourth, personal financial management. This is one of the most commonly cited examples of Open Banking. Instead of having an app for each of our bank accounts, we will be able to use just one app to get an overview of all our finances, with useful graphs and trackers to monitor our spending, flag potential problems, help us set goals, and offer us solutions, such as loans, to help meet our goals a little faster. Instead of the incumbent bank, a new third party will own the direct relationship with the customer.

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Lastly, 'know your customer' standards. This is about meeting regulatory requirements to vet customers, financial counter parties and others for credit rating and to fight crime, fraud and terrorist activity. Now, the vetting process is faster and easier – and enables financial institutions to offer this as a service to customers.

Rapid shifts and slower burns

So, how disruptive are these different types of service likely to be by 2025? On the one hand, the first two will clearly have major shorter term impacts as merchants and new players reinvent the value chain. On the other, it's easy to see the potential for new lending and personal finance management facilities that extend consumers' power and choice and give new players ownership of direct customer relationships. However, the success of these types of services will heavily depend on take-up.

Broadly speaking, when it comes to banking, consumers often stick to what they know – in fact, it is said that we're more likely to change our life partner than we are to change our bank. It's useful to look at the de-regulation of the energy market as an indicator. It took a few years for a critical mass of consumers to act, and a yearly saving of around £290 before people switched utility providers.

Staying agile

PSD2 does, however, go a long way to level the playing field. And with incumbents and new players all looking for similar ideas, collaboration is the best way to gain an edge. Smaller market entrants should try to develop white-labeled services that can be branded by governments or bigger institutions and seamlessly plugged into larger ecosystems. In turn, incumbents need to keep a close watch on the kind of differentiated services and innovations that Fintechs are devising. They also need to evaluate what is core, and what could be outsourced to reshape their organization and infrastructure to be agile enough to operate in a more open and dynamic environment.

Now that we have briefly discussed the added value of Open Banking, we see how this new ability to engage with and add value to consumers will no longer be just the preserve of banks, but will be shared with Fintechs, retailers, software companies and other innovators. As such, PSD2 isn't just the driver for Open Banking, it's the prelude to ongoing disruption as regulators liberate other parts of banking into the market. Institutions need to act now – not just to embrace PSD2, but to be ready for future directives.

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Future of blockchain for financial services

– by Ivo Luijendijk, Global Industry Director Financial Services & Insurance, Global Blockchain Director and member of the Atos Scientific Community –

Blockchain applications

Blockchain is the first technology that offers a way to fully manage digital assets in a trusted, traceable, automated and predictable way. What distinguishes blockchain is that each 'block' is linked and secured using cryptography. Trust is distributed along the chain, eliminating the need for a trusted third party to facilitate digital relationships. Over the years, the applications of blockchain technology have gradually become very apparent.

Bitcoin was an early and famous application for managing digital assets (Bhutta et al., 2021; Nakamoto, 2008). The second application of blockchain is 'smart contracts' whereby contracts can be maintained and managed entirely digitally between participants (Ante, 2021). Ivo Luijendijk:

"I clearly remember when I bought my first Bitcoins back in 2011: just three, for around a hundred euros, to get a feel for this strange new currency. For me, that moment was career defining; while I certainly didn't become a crypto millionaire, after a few days of hard math and complex theories, my hundred-euro investment led me to a new passion: the revolutionary 'chain of blocks' connecting those digital assets.

Fast-forward seven years and I stand by my original assertion that the underlying blockchain technology actually out-values the new currency; in fact, it could change the world. So why do I say that? Let's look at some applications and examples of blockchain in financial services.".

Enabling digital transformation

This ground-breaking technology does, however, come at a price, because the whole network needs to invest in it to achieve the necessary levels of trust to make it secure. Given Bitcoin's particular profile and less reputable associations, other blockchain innovations have emerged that have trust built into the network through the power of reputation. The result is a third application of blockchain: the digital ledger. This is a simple distributed database where an undeniable sequence of events can be logged, possibly as a foundation for automated business process handling (Becker & Bodó, 2021).

The technology is flexible for all sorts of purposes, for payments, retail banking, investment banking, corporate banking, corporate treasury and risk and compliance. It can truly strengthen (or replace) most of the financial or legal facilitation that is currently offered by banks, governments, or the notary.

Given that blockchain is a versatile automated solution that can be applied to a broad range of business processes, value chains and even business models, its value - as the final piece of the puzzle for fundamental digital transformation - seems clear. If blockchain is such a great and unique new tool, then

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why isn't it a mainstream service yet? There are two key challenges that need to be addressed for blockchain to enter the mainstream (Moudoud, Cherkaoui, & Khoukhi, 2021).

Firstly, the challenge of interoperability. There is no one blockchain to serve all purposes and requirements. And on top of that, if the financial services industry has taught us anything, it's that there is great value in creating networks of service providers rather than multiple platforms.

The second challenge is sustainability. There is no way that a consensus protocol like the one used for Bitcoin can offer a long-term solution to high-volume transaction processing because of the huge amounts of energy it consumes. This makes it too slow, resource-intensive and difficult to scale. While some work has been done in developing alternatives, none of these have gained enough traction so far.

Blockchain is clearly a promising technology that needs to get out of the lab and into business. Most predictions are that this will happen within five to ten years. While I like to think that five years is closer to the mark, blockchain's maturity still has some way to go. But these challenges need to be taken into account in order to become successful over a longer time horizon.

Digital Vision for Financial Services

This article is part of the Atos Digital Vision for Financial Services opinion paper. We explore the challenges and opportunities in a newly disrupted space for banks, insurers, Fintechs and technology incubators, who are today experiencing an unprecedented rate of technological and regulatory change.

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The road to universal personalized finance

– by Frederik Kerling, Global Portfolio leader and quantum industry director Global Financial Services and member of the Scientific Community –

These blogs around personalized finance answer questions about what personalized finance is, how it adds value to both parties, why we don't have it yet, and how we might get it in the future. Interested?

In his role as Head of Fintech and acting industry CTO, Frederik gets the opportunity to talk to many spirited individuals with great visions of the future of finance. They manage to create value, shape solutions for specific challenges, and transform the financial services world into something more sustainable, inclusive and profitable.

However, looking at the greater picture of it all, some of these visions get hopelessly stranded. They get stranded for a simple reason: It is hard to overview all aspects of a financial organization. Each one is made up of its people and value add to their customers, all the way down to the internal processes and IT foundations. These organizations are the oldest in the world, and were the first to adopt digital technologies at scale.

And this brings us to an interesting question, one that we have probably all experienced, but maybe never realized. We've all experienced personalized ads. That these ads bring negative aspects is quite known, for instance illustrated via the Netflix documentary "*The Social Dilemma*". You might have faced these bad aspects yourself, for instance when you shopped on Amazon and received product recommendations or when you received YouTube ads that were so uncannily specific you stopped watching YouTube to first check which apps are using your microphone.

It is clear, beyond a shadow of a doubt, that we are technologically capable of providing a personalized digital experience. Then, you may wonder: Why do I not have a personalized financial experience?

It's not like the concept doesn't work. There are millions of people working in personal banking and advisory, we usually get our own insurance policies from an advisor as well. So, the value add is clearly there for the consumer. For the institutions there is also a clear value add, a clearer risk picture of their customers, lower churn in their retail, gaining more clients, upselling new products to existing clients, better customer satisfaction, the list goes on and on. It is beneficial for both the provider of financial services and us as the final consumer of those products. We are even accustomed to paying for it.

So why isn't it common practice yet? Frederik has asked himself this question in the last few months throughout his personal quest, and believes he has found the answer. In the next subsections, we deal with why it isn't here yet and how one might solve this, looking at the technology to provide these insights, the value they add to financial organizations, the bottlenecks these organizations experience, and how these bottlenecks can be resolved. In the end, the hope is that financial organizations are willing to do the work so that everyone can enjoy this personalized experience and be helped in their financial goals.

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Whether it is gaining a higher financial maturity or independence, that hard savings goal, or finding that new mortgage for that house still to be found, let's unlock this value for the consumer.

Personalized finance in banking

This subsection discusses the value add of (hyper)personalized finance, which will create a clearer image of what it means.

Personalized finance is what it sounds like: a financial service customized specifically to an individual. You can think of it as a personal banker that customizes every product, every advice, and even their office building to your specific needs. Similarly, you can view it as an insurance policy advisor that can make a personalized policy specifically for you, but also predicts what is advisable to prevent you from harm. Luckily, unlike personalized ads, the business model here is not to sell your personal data. Instead, there is a win-win situation. Here are a few examples.

A nice example lies within financial maturity and financial independence. Financial maturity and independence mean that a consumer is in control of their finances and can achieve their financial goals, such as saving up a certain amount of money or making optimal usage of funds. For example:

A person has trouble saving up money:

A personalized finance service would be one where you can set a certain savings goal, and you automatically deposit small amounts of money into a savings account that becomes accessible at a specific date. The service makes deposits based on your spending behavior and happens without you noticing it. The value for the consumer is that they are helped to achieve their financial goals. One can even imagine a 'template' for people where such goals are bundled together to achieve greater financial independence. The value for the bank is that they have more of your assets in their custody, which is part of their business model. This is a win-win situation.

Two people need a mortgage, but they are having trouble as they are both freelancers:

The bank can predict your needs and judge the risk and your ability to pay for the mortgage based on the transactions you've made in the past. This means you get an offer for a mortgage, prior to you having to look for one. The value for the consumer is that they need no up-front proof, and they are no longer regarded as a 'group' to assess financial risk. There is no difference between someone under employment or a freelancer. The value for the bank is that they can accurately assess risk and assess changing risk. They need to reserve less money to cover this risk. Also, they can offer the best product to their client as they have all the information, and it is in their best interest to do so.

Personalized finance in insurance

There are multiple examples for insurance, but regional differences apply due to differences in legislation. Let's take up the example of prevention of medical claims:

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A person has incurred a set of medical bills recently, and they have an unclear future path ahead of them:

> Here, personalized finance would look for patterns in your bills to assess what kind of health characteristics might match. Based on that information, the insurer can recommend that you have a certain checkup, or perhaps change parts of your lifestyle to prevent you from further harm.

The value for the consumer is clear: being healthy has a lot of value and this benefits their independence. The value for the insurer is also clear, as a healthy client is a client that does not need to file insurance claims.

Each person has a uniquely tailored set of components in their policies, and they only pay for what they need:

> In this example, every component of an insurance policy is tailored specifically to you, and ideally tailored to you based on your lifestyle. It assesses what risks you might have as an individual, and covers your risks based on how you choose to live your own life.

The value for the consumer is that they never have to pay for something they do not use. They do not suffer from the choices of others affecting their policy rates, nor do they have to fear unexpected costs that might put them in financial jeopardy. The value for the insurer is that they alter their view of risk. Rather than make risk estimations for large groups, they have a rather exact view of risk and how it is changing. This makes payouts far more predictable. There are of course lots of more examples, not just in the sub-markets described above. But this article is restricted to those that most of us have faced at least once in our lives as this is relatable.

Why financial institutions haven't already adopted personalized finance

First off: None of these problems are insurmountable. But they are major challenges and will not be easily tackled. Each of the resolutions requires a mind shift:

Think not "This cannot be done!" but rather "How do I discover how it can be done?"

Not how we do risk

There is a certain human-driven way we've been dealing with risk over the past few decades. At their core, financial institutions make money because they know how to estimate risk very well. Once humans became capable of handling large volumes of data, we've been able to do quantitative risk management.

Risk management is human driven in the sense that it mostly relies on groupings that we humans have conjured up. But these groupings needn't always represent what is true in practice. A good example is how we've categorized animals in the animal kingdom. Due to DNA sequencing we are discovering that some animals are not even remotely in the same family group, and that some are instead unexpected cousins.

Over time, we find better groupings and engage in risk management based on characteristics like age, gender, location of residence, and other straightforward characteristics. But this is not how machines

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would do that. An AI is not limited to a handful of characteristics and can easily use thousands simultaneously. They do not have an internal bias. They have only the data to base their 'bias' upon, and hence have a fresh look. An AI model will find better groupings that might be hard for us humans to understand, but they work, and they work better.

An AI driven risk solution allows for an individual to be part of many groupings, creating their personal 'footprint' which will likely be unique for every individual. But in the backend, these groupings still follow the same predictable statistical rules as before, just more accurately. In short, we've enabled a highly personalized profile by letting machines rather than humans profile us based on vast amounts of data. This is not what we are used to.

Not how we can serve our clients

Most of us know from experience that dealing with an account or insurance provider can be dreary. Financial organizations trade in large and impactful sums of money. They have a variety of processes, principles, and other methods to minimize mistakes or losses. They are also quite heavily regulated by governments. It is hence no surprise that most financial institutions are not agile.

This is in sharp contrast with the telecommunications industry. Rapid technological development and a heavily burdened customer churn forced them to adopt agile or fully scaled agile ways of working to stay competitive and retain clients. Financial institutions have been omitted from a heavy client churn -- or have they?

People might not easily change accounts, but they do change how they consume financial services. Think of person-to-person payments apps like Venmo or Square Cash, payment providers like Paypal, and even investment apps like e-Toro and cryptocurrencies. Also, when people need new financial products like a mortgage or insurance policies, they shop around to find the best deals for them.

Unlike with our solitary personal phone numbers, the churn financial organizations experience is not leavers and joiners, but rather a deposit displacement. The lack of agility to adopt new products and service their customers based on what they really need is a big drain.

Why not predict what people need, and offer it to them proactively? After all, financial organizations still have better trust ratings than incumbent new players. Yet, to do this, they must be able to change their business models and products in an agile manner. This is a problem for most.

Not what our backend can handle

Lastly, there is the term that everyone in the financial world should be familiar with: Legacy. Most of our modern world of transactions is still being serviced by monochrome applications from the mid-90s, each insurance policy often has their own backend, and customer services systems are not linked to core-business systems.

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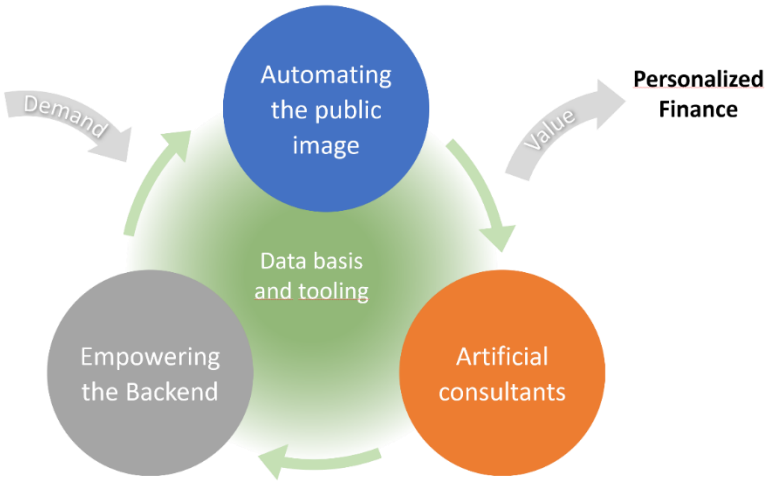
Over the years, a multitude of Fintechs have developed a wide range of overlays and smart applications that enable the desired functionality on the front-end, without having to change or alter this old legacy back-end. Organizations are wary to transition their back-end as it is costly, risky, and tends to fail. Postponing the legacy modernization is however an extinction strategy. Every financial institution has a retail customer facing system that ages faster than the demand from customers and technology around them.

These systems cannot handle a product that is unique for every individual. They are simply not made that way. Only some of the most modern core insurance and banking engines come close.

It is not a question of if, but when legacy systems must modernize, be it because of cybersecurity risks, regulatory pressure, or an inability to maintain them. Eventually one must make the simple assessment: do the risks of transition still outweigh the loss of business I get by not transitioning? The answer to this is increasingly heading towards a no.

How to transcend current challenges and go about implementing universal personalized finance

How can we go about realizing personalized finance?



The basis and tools for data coupling

The basis for data coupling is a data infrastructure used to couple your data sources. You also need this to enrich data sufficiently with meta-data, because you must clear all potential (unintended) biases if you want to optimally leverage AI. A rich data source is critically important to this goal.

You need to couple all formats of customer interaction to this data basis. That means customer behavior on company websites, usage of apps, computer processed calls with natural language, and maybe even written correspondences. Basically, whatever interaction customers have with your organization should be included.

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Customer identification and attribution enable all these data sources to be reconciled in that data infrastructure which we require as an unbridled basis for personalization. This can be a challenge.

Automating the public image

The public image is how an organization is perceived by those interacting with it. Automating this means that this image is one of the goals of personalized finance. Everyone can potentially deliver personalized finance, but what are the values that they get from interacting with you? What makes your organization unique, and how is this felt by the consumer? This will be reflected in the personalized finance that you will deliver.

You must start with defining a set of your financial products. Which of them benefit from a personalized experience? Which defines you as an organization? Which will have a significant impact? Bundle these in your first personalized product portfolio. You start small, but not too small to not make an impact. It is a challenge that deserves your attention.

Measuring success is much simpler in a hyper-personalized environment. But this success will also be more volatile and change regularly. You must define an operational goal and let go of periodic reviews. Instead, define the criteria for success and define boundaries when to change your approach. Your success is measured by how well you stay within those criteria and boundaries, and how you deliver the value that you've defined as your goal.

Artificial consultants

"Artificial consultants" are the artificial personal bankers and artificial policy advisors that service your client. These are the AI models that power the personalized finance experience. You could opt for an avatar or simple web or app interface, but the result should be the same: a personalized experience. The AI models need to purport the public image you've set for yourself, and should be able to identify the unique situations for each customer interacting with you.

You should start using existing AI models to deliver value quickly. People tend to be quite the same, life challenges are not unique, and you need not reinvent the wheel. Make use of existing models, and gauge how they relate to your goals. The models can improve over time based on your specific client base, and to deliver the public image you desire.

It can be possible that you create a new unique added value that is not part of any existing AI model. There are many cases that are unique due to target audience, geography, new products, or even current events. The AI platform provider, or your own organization, needs to be able to train new models too, so that you can support the journey to personalized finance.

I should note that even off-the-shelf AI models are already a dramatic increase in personalization. Most financial products are gauged by around 10 identifiers, and this can already be a stretch to service. In

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comparison, the average off-the-shelf AI model implementation uses about 30 to 50 models. This is a big mind shift in personalization and treating people like the unique individuals they are.

Empowering the back-end

With continuous experiences come continuous product offerings. Working in daily batches doesn't work and doesn't provide the experience people expect. Individual offerings don't work with a one-size-fits-all system. By empowering the back-end, you make sure that your product back-end can service and adjust with the same speed as the needs of your customers and changes in the market.

In most cases, this requires an often long-avoided modernization of core systems. There are many ways to do this, but personalized finance can be viewed as the lucky break to modernize legacy systems. A personalized experience is almost always more favorable for the end customer than their existing products. Switching their products from a legacy environment to a new environment comes naturally. Due to the highly personalized nature, even for those customers relying on older mediums of interaction, the marketing is almost automatically taken care of. You know exactly who to target with what. Personalized finance is your best bet of ridding yourself of legacy systems in your retail service lines.

Delivering personalized finance

Once you have taken care of the technological and organizational basis, you can start delivering true value through personalized finance and then grow from there. The relationship between provider and consumer can improve by switching from linear engagements to continuous personal relations.

Join in and redefine how people consume and view financial services. Let's work towards a world with greater financial maturity, better access to financial services and products, and reduced risks and market volatility for everyone.

Now that you have been presented with a selection of the many research papers and articles and are up to date regarding the cutting edge research on collaborative Fintech Networks, please follow our FINDER Early Stage Researchers into the next chapters where they will reflect and elaborate on the lessons they learned and the policy implications they believe come along with their findings.

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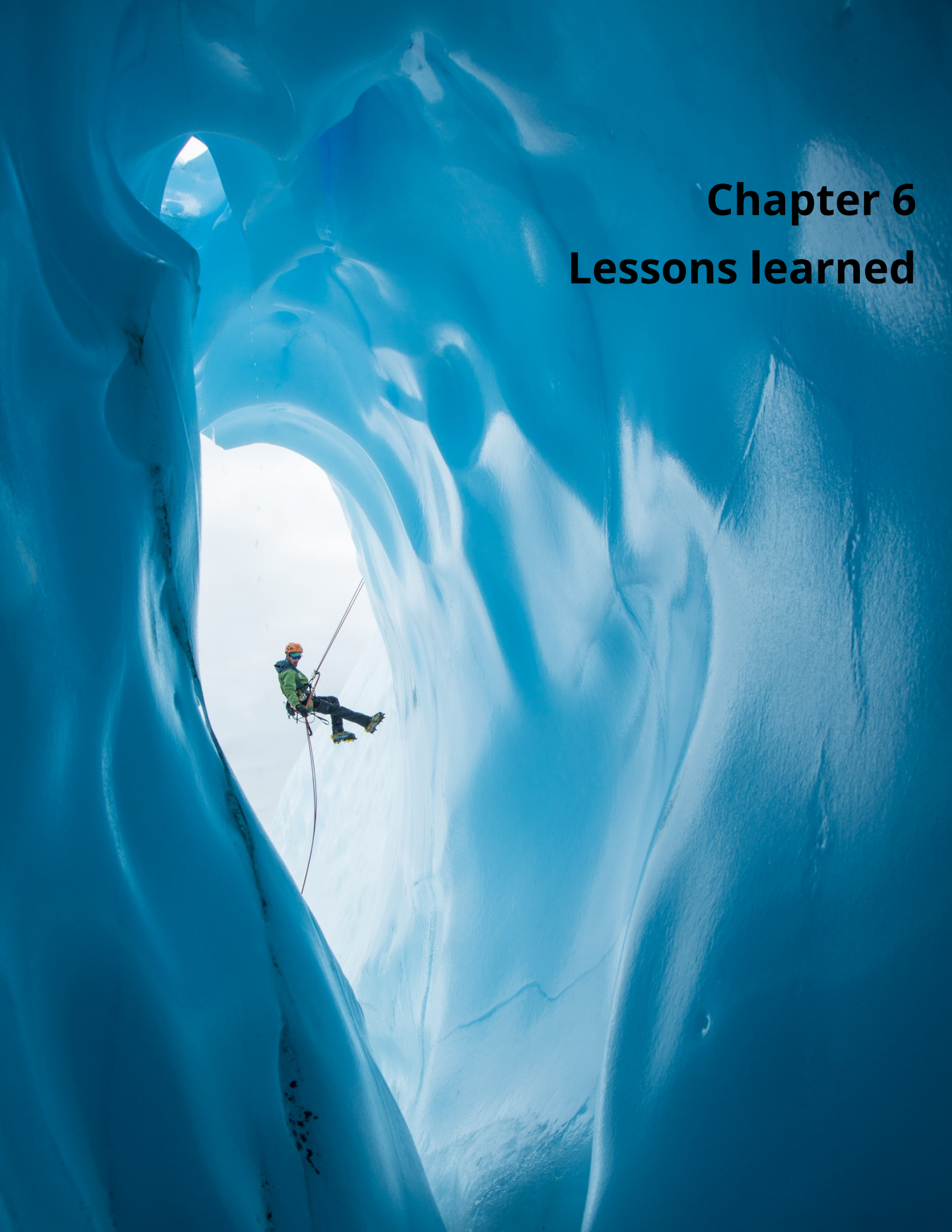

Chapter 6
Lessons learned

In this chapter the FINDER Early Stage Researchers (ESR) will elaborate on the lesson(s) they learned and could be taken away from their individual research track.

– by S. James Ellis, FINDER ESR –

The digital financial services space, as practiced in a western European setting, has proven to be a unique site for researching collaborative/networked innovation, if just for the sector's acceleration after PSD2. This regulatory step theoretically lowered significant barriers that kept new entrants from seriously affecting the precursor technological hegemony; by legislating towards a more open format where new entrants to the industry could build value-added services around consumer financial data, this not only breathed a wealth of innovative talent and knowledge into the sector, but the data themselves became much more valuable and liquid.

The sharing of data between coopetitive parties in this sector may well come with certain due concerns; monetizing information concerning our habits and patterns of consumption in a general sense brings to mind philosophically leaning questions concerning *why*, for instance, patterns of an individual's spending habits are valuable to another in the first place. But, it would be hard to deny the benefits of technological innovation that has happened in this space as a direct result of sharing data, knowledge, talent, resources, etc.

For instance, consider a migrant worker in country, earning in one currency, who sends remittances monthly to family members in a different country of origin and in a different currency. The opportunity to exchange and wire transfer remittances has long been available, but oftentimes there are few competitive options which can lead to predatory business models that involve disadvantageous exchange rates or exorbitant wire transfer fees. Though the new wave of Fintech companies operating in the confluence of these spaces are not *prima facie* immune to these business pitfalls, the sheer number of new competitors providing these services as well as additional ones bundled into them at least shifts the consequence of competitive innovation into the consumer's favor.

This is certainly not localized to the remittances industry. We all stand to benefit from a competitive landscape where networked innovation is encouraged. However, and as we will discuss in the next section, this landscape and the cultivation of ecosystems within it must be well regulated, as collaborative business models are just as prey as any other to the vices of human inclination.

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– by Jonas Röttger, FINDER ESR –

The financial sector has undergone substantial transformation induced by technological change. While the critical focus of incumbents initially lay in defending their market share against new competitors, today's landscape shows that collaboration represents the most common form of dealing with new ventures. Here, mergers and acquisitions play a crucial role in collaboration because they enable incumbents to innovate and ventures to secure resources. However, since M&As tend to be disliked by shareholders, influencing firm outsiders' evaluation of new deals is an important part of the acquirer management's job. Our research suggests that firms attempt to manage stakeholder perception by manipulating strategic announcements' linguistic tone (sometimes referred to as sentiment). Our study on 2000 acquisition announcements revealed that firms tend to be overly optimistic in their announcements, but surprisingly investors react more negatively to positive announcements. However, this relationship hinges on other signals that help investors assess the value-creating potential of a deal, like an acquirer's leverage and the payment method used to finance the deal. Overall, the results suggest that linguistic tone has a substantial effect on investors' evaluation. Moreover, in a different paper, our research showed that the visual presence of a CEO in an acquisition announcement (called CEO salience) influences firm outsiders' deal evaluation. If the acquirer CEO is present in an acquisition announcement, security analysts are more likely to downgrade the stock. If the target CEO is more present, investors are more likely to react increasingly negatively.

– by Jonas Geisen, FINDER ESR –

In comparison to other industries the financial sector is still catching up to adapt to the digital transformation. The necessity of strategic change for high-tech industries reflects in the magnitude of structural changes. With our research we observe two major trends.

First, international organizations keep leveraging activities corporate development. From alliances to acquisitions and divestments corporates make use to adjust their scope and portfolio to not only survive but thrive. In this area of research we can observe that a program perspective accounts for this non-linear nature of change necessary. Instead it allows to highlight how change occurs in focused, punctuated, temporarily switching, or sequential rhythmic patterns. Upper echelons must continuously walk this thin red line of organizational improvisation – to change by weighting plannability and adaptability. By combining the *'when'* and *the 'why'* we find that portfolio program strategies that account for both adaptability and plannability allow to achieve optimal performance.

Second, we observe the increasing trend of firms to organize in ecosystems. This is an interesting learning that depicts that cooperation gains in importance. Especially the cooperation in ecosystems depicts how products and services become increasingly complex. It seems that such complexity cannot be overcome by usual alliances or acquisitions. Instead resources need to be bundled across different organizations to be realized. Nonetheless, there remain major questions about the successful implementation and running of such ecosystems to be unraveled by future research.

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– by Ami Xiaolei Wang, FINDER ESR –

Startups play a prominent role in society such as innovation, economic growth and job creation, still, they also face new challenges and developments to survive. In particularly, Fintech startups have been the key drive to create the innovation in the financial sector, we know little about how startups enhance competencies and business performance. We embrace organizational responsibility by examining the role of interfirm relationships among firms to examine their implication of startups' performance. For example, startups are struggling to understand the complex investor's relationships. The competencies of startups may be navigated by the complicated investor's relationships. Our new theoretical framework and empirical contributions could do much to advance our understanding of identify and manage the complicated interfirm relationships.

Financial technology is experiencing rapid growth last few years. Indeed, Fintech is about the new technologies revolutionizing the financial sector. While most existing research on Fintech focused on the phenomenon of the technology revolution, it is important to remember that the effective strategies in Fintech how to enhance the social payoff that has been rarely studied before. In this trajectory, I assess the potential impact of Fintech on the finance industry, focusing on the effective coopetition strategy. Learning from the past and our work is critical when we come to policy and regulation suggestions with Fintech. For example, how to develop and implement policies to drive both cooperation and competition that provides more benefits to consumers with better products. Thus, regulators can develop policies that regulate Fintech innovation which balances the collaboration and competition in the financial sector. Those policies can empower Fintech start-ups to scale up and enhance the social payoff for consumers.

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Chapter 7
Policy Implications

With knowledge comes not just power, but also – and arguably even more important – responsibility. What consequences derive from new knowledge? Are there any implications to follow up on? Are there changes to be made, and if yes; what kind of changes? The FINDER Early Stage Researchers (ESR) have done a lot of research these past years – some of the research results are shared with you in this book. Research leads to gaining knowledge, and knowledge can be put to practice. When studying the various angles surrounding innovation networks in a digital era, it's only logical to translate your academic findings to practice. And that's where policy implications come in: what could or should be adjusted in current policies? In this chapter each ESR presents their ideas re policy implications deriving from their individual research.

– by S. James Ellis, FINDER ESR –

There is a practically infinite span of possible technologies that firms can combined and leverage for their business purposes. The nature of value and the value of data seem to drive the scenario for now, and a future where data are less valuable than they presently are seems unlikely. Thus, policy advice originating from the track of this project concerned with networked innovation speaks to the regulator – be it at the firm, industrial, national, or international level – who identifies the sharing of data between collaborative organizations as the most critical resource to be protected; not only the trade of these data but also ownership of them and a proper consideration of what is owed to the source.

For instance, the European consumer can opt to share consumer financial data with third parties in order to gain access to those third parties' value-added services. This is a Y-shaped deal, however: the consumer is at the bottom of the Y, gaining only the service; the third party, however, is at the top of the Y: receiving both capital revenue from the consumer or whatever intermediating party links these two, as well, in many cases, as the consumer's user data to help fine-tune their services.

So far, so good; however, what happens when an extraordinary amount of value is added somewhere in the value chain that has now incorporated the consumer's data? In these cases, the firm adding and capturing that extraordinary amount of value is accepted to have accomplished this task by themselves. Yet, there is a party in this equation very clearly missing their due: the consumer originating the data.

To paint a quick example to illustrate my point, consider the ubiquity of music streaming services such as YouTube Music or Spotify. The user's idle listening generates a wealth of data throughout the day. Now consider wearable devices that track the user's vital signs, such as their heart rate and stress level. Ignoring proprietorship concerns, the confluence of these data streams could yield an impressive amount of new, inferential data about which genres of music the user in question prefers in which moods, at what activity levels, etc. It's not unreasonable to then imagine a company adding another service to this mix, brokering data between your music streaming preferences, and your wearable vitals (as well as whatever intermediaries provide supporting hardware/software) to sell you a new service at a higher premium that offers mood- or activity-specific music streaming.

Despite that this service would likely cost you in some way, you would not see a penny's worth of value from the data you've provided for two companies to extract value from, and this is an issue in need of

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address. With the growing demand for data, a regulatory framework that establishes 'royalties' for consumer data is proper; not only to share due prosperity with the user that originates the data, but because it will also necessitate more careful decision-making around a valuable and vulnerable resource that should be protected and conscientiously managed at all commercial costs.

– by Jonas Geisen, FINDER ESR –

The insights provided in the session conducted by FINDER revolve around the Gaia-X project and highlights how supranational, inter-organizational projects can foster the competitiveness of specifically targeted industry. Gaia-X clearly shows that such projects are dependent on a clear cut problem from which a mission is derived (Edquist & Zabala-Iturriagagoitia, 2012; Mazzucato, 2018).

The problem the European financial service industry faces is an decrease in global importance. So far the field of propelling the industry has been left to US and Chinese actors who have been predominant in the adaptation of technological innovation. European actors have to step up their game to secure data sovereignty and thus obtain a competitive position when it comes to data-driven financial services. Accordingly, Gaia-X is a response to increasingly structural change, fueled by technological innovation. Its mission: enable participants that are reacting to the challenge of adaptation with increasing speed (Schwab, 2017).

The session conducted highlights a best practice of open innovation projects organized as ecosystems. Setting a focal clear-cut joint mission enables:

> bundling both relevant actors of the private and public sector, unite them under supranational umbrella, and set clear boundaries in the form of targets to achieve feasibility and focus.

With our whitepaper the FINDER project, in collaboration with TechQuartier, facilitates the understanding of how open innovation projects can be successfully implemented by policy-makers. To do so we study the case of the Financial Big Data Cluster (FBDC) to test the design principles proposed by research.

Since the millennium both the aim to develop inter-firm open innovation projects as well as research to enable that development has bloomed. Aim of these studies in the field of economics (Industrial economics, new geographical economics), economic sociology and business administration have been channeled to enable both companies as well as policy-makers to develop, implement and grow such innovation efforts (Arthurs et al., 2009; Hamdouch, 2007; Yu & Jackson, 2011). However, ambiguity remains as both the organizational form as well as its implementation are both under discussion. For a long time the organizational form of innovation clusters, defined as a geographically arranged group of actors from a specific industry built around a dominant player, has been dominating (Delgado et al., 2010; Engel, 2015; Porter, 2000; Yu & Jackson, 2011). Progenitor of this approach is the infamous Silicon Valley. While unrivaled in its success as a host of innovation the attempts to replicate it have been manifold but less successful. There is, however, a challenger regarding the conceptualization of open innovation - ecosystem thinking. Only recently has it gained prominence. While being relatively young this stream of

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research can be, due to the fuzzy multitude of definitions, difficult to navigate. Therefore, our whitepaper aims to equally inform policy-makers – what innovation ecosystems are and how to foster these - as well as intra- and entrepreneurs - on how to partake and organize within such formats.

Therefore, our whitepaper starts with stepwise fleshing out the core concepts of innovation ecosystems as multi-stakeholder projects. Focusing on one clear cut definition helps to unravel the design principles which are paramount for the fruitful support of an existing or even the successful initialization and implementation of innovation ecosystems. At the same time the question about the locus and level of control of such a multi-stakeholder project follows. From a policy-makers point of view a logical question as some level of control is necessary for publicly funded projects, as is the exemplary studied case of the FBDC, lighthouse project of Gaia-X.

Sub sequentially, an overview of how innovation ecosystems can be managed, and to what degree, is provided. While at first glance it may seem detrimental, open innovation pursued through an ecosystem benefits, to differing degrees depending on its composition and developmental state, from being orchestrated. Orchestration itself is derived as a spectrum of being conducted by a central entity (in a dominating manner) towards jointly by all participants (in a consensus-based manner). Our case study, undergirded by research, therefore highlights that at least one managing entity, called an ecosystem orchestrator, that holds some locus of control enhances the chances of success. However, orchestration should be able to be switched task-specifically between the different modes. Especially for the initialization as well as the early stage a guided coordination - e.g., to formulate a shared mission as the pursuit of a shared value proposition - of the ecosystem seems to profit from a more central entity.

A subsequent question thus is what kind of entity should take the role of an orchestrator in a publicly financed ecosystem. We suggest an innovation hub due to two reasons. First, innovation hubs core value proposition is centered around the networking of multiple stakeholders as start-ups, corporates and universities - all vital actors within an ecosystem - as well as the orchestration of joint projects between these. Such experience provides a valuable lever for the difficult task of orchestrating a multitude of different ecosystem actors. At the same time this provides innovation hubs with a quasi-neutrality as their core business foundation usually is not based on the development of services or products for individual clients. These factors provide innovation hubs with a flexibility to not only orchestrate in a dominant but also consensus-based manner adapting to the situational necessities.

Given these design principles our whitepaper further investigates if and how they are applicable and conducted in the case of the FBDC. We find that the design principles elaborated upon are applied leading to the current success of the project. Ultimately, the overview of structure and observed best-practices can serve policy-makers as a template for future endeavors to initialize and implement ecosystems for open innovation.

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– by Jonas Röttger, FINDER ESR –

It has become clear that data is a cornerstone for the financial services industry, since the majority of products are digital. From the industry-exposed research conducted as part of the FINDER project, the following topics were identified as potential points of actions.

Firstly, while there is a European initiative to protect customer privacy, its implementation is still in its infancy. Following the privacy paradox, privacy is highly valued, but seldom properly executed if the usage is inconvenient. A proper implementation has to take this into account. That means that protecting privacy does not only entail providing customers and citizens with the opportunity to protect themselves, but also providing it in a manner that is convenient and understandable for the majority of people.

Secondly, the access to data and the opportunities to analyze it are improving for companies within the financial services industry. A key metric many players wish to have solid predictions on is the risk associated with handing out various financial products to customers. While data access and analytical capabilities are improving to achieve better estimates for these risk metrics, they also represent a risk for society themselves. That is for two main reasons that apply to supervised machine-learning approaches, which represent the majority of the current AI algorithms in use. Firstly, the data used to train the models potential contains biases that discriminate against people. These biases will be maintained if this data is fed to the machine without curating it. Secondly, while the data biases might be to handle, the algorithms on the other side might only be poorly equipped to visualize how their conclusions were created. Combined, these two risk factors require that there is highest transparency about the data input and the algorithms applied.

– by Ami Xiaolei Wang, FINDER ESR –

The responsible organization evaluate the impacts of its business activities and outcomes on society and the environment, through responsible behavior. Among the organization, start-ups play a critical role in economics and growth; however, their peculiar features and limited resources drive them to adopt interfirm relationships compared to large companies. Particularly, extant research suggests that startups survive and thrive in high-tech is prominent for innovation. In the last decade, Fintech startups play a vital role as key driver of the innovation in the financial domain. Yet, we know little about how Fintech startups drive innovation and enhance performance through interfirm collaborations (Soriano, 2018). As interfirm collaborations are an important channel for startups access resources, mitigate risks and enhance performance (Ahuja, 2000; Ozmel, Yavuz, Trombley, & Gulati, 2020; Yu, 2019). By offer more insights of the role interfirm collaborations in Fintech startup's innovation process. We provide more insights for Fintech startups, financial institutions and policy makers through our studies regarding the management of innovation in Fintech.

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If not (yet) familiarized with the terminology used in this book, the below will assist with obtaining a clearer understanding with some terms being used. This chapter does not read like a dictionary, but emphasizes our take – or interpretation as you will – of certain phrases that you encounter throughout this book.

Fintech: Defining a Constantly Evolving Term

What is Fintech? Financial technology (abbreviated Fintech or Fintech) is the technology and innovation that aims to improve consumers' use and delivery to better digital finance service to them. However, the definition and context of Fintech is still unclear. Thus, in this chapter, each of the FINDER affiliated early stage researchers, provide their personal and in-depth, detailed definition, within a real-world context of Fintech. The plurality of definitions lays out the complexity of this new organizational form quite effectively.

– by Barbara Völkl (FINDER ESR affiliated until 31 July 2020,
now Policy Officer Digital Financial Technologies | German Federal Ministry of Finance –

A Fintech is an organization using 21st-century technology and software to provide, ease and automate financial and insurance services of any kind as captured in the NAICS Codes 52. The definition is not restricted to start-ups. These serve however as clear examples of Fintechs as – in contrast to incumbent banks – they mostly focus on one concrete aspect of the financial service world. A Fintech always contains a technological component; a mere business model change does not suffice. An interesting point: currently there are no specific SIC/NAICS Codes for Fintechs, which highlights their bridging position between technological and financial organizations.

– by Jonas Röttger (FINDER ESR and currently PhD candidate at Institute for management research Radboud University, The Netherlands) –

The term Fintech is often used as short-term for financial technology or financial services and technology. The term defines a company or a solution that uses technology to provide financial services. Depending on the context, a company's size (rather a start-up or scale-up than an established company), a company's portfolio (rather entirely focused on technology for financial services) and the innovative and industry-disrupting potential (rather high) are often consulted to define Fintechs in a narrower sense.

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– by Jonas Geisen (ESR and currently PhD candidate at Institute for management research Radboud University, The Netherlands) –

To grasp the full meaning of Fintech it may be worthwhile to expand the perspective. Looking beyond the horizon of a focal firm allows one to paint a more nuanced picture. Firms that classify themselves as innovating financial technology are not only a detached individual actor in the financial services. Instead they're an integral part of this vast ocean of firms operating in this industry. Since they shake up the slow moving industry that has been rather conservative regarding change. Not only did they reverse the industries stance regarding change but also broke-up the economic dogma of competition. To understand why and how they accomplished that one first needs to understand the advantages and disadvantages Fintechs encounter.

Taking a historical perspective, the phenomena of Fintech is rather young. As its name reveals it entered the world stage with the ever accelerating digitalization of the 4th industrial revolution. Reason for being classified as their own category? The financial service industry overslept to incorporate technology to fulfill customers' expectations. As a new venture, without a burdening history complicating to establish new ideas, they pursue daring value propositions (to fill a relevant gap) through dashing innovative ideas. These ideas, in the form of new processes or services not only fill existing gaps but also transform the industry by introducing innovative business models. Being a freshman, however, also has its downsides. For start- or scale-ups that downside is called liability of newness and smallness. Being young and therefore small means, in comparison, lacking resources, long learned capabilities, and a track-record behind one's name. Therefore being young and small also means being vulnerable, ultimately decreasing ones survivability.

Conceptually, overcoming these liabilities seems quite easy but also paradoxical. One needs to survive long-enough to grow from a start- into a scale-up into a mature firm. Thus, attracting customers is the name of the game. While conceptually easy, this is a difficult task in reality.

Initially it may seem counter-intuitive but this is the reason that competition, while still existing, as the underlying economic dogma has been thrown out the window. Instead, collaboration allows especially young Fintechs to augment their existing resources, capabilities, and access to customers. For established players in the field such explorative activities are both expensive and risky. Hence, leveraging such trailblazers of innovation through collaboration (or integration) is way more attractive. A win-win situation.

Ultimately, expanding the perspective of Fintechs from individual actors towards integrated players of financial services highlights two important developments. First, Fintechs explore and fill the gaps to digitalize the financial industry through new value propositions and business models. Second, by challenging existing business models they make themselves interesting partners to change these, paving the way for increased interconnectedness of the financial service industry.

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– by Ami Wang (FINDER ESR and currently PhD candidate at Institute for management research Radboud University, The Netherlands) –

Fintech is a combination of two words: 'financial' and 'technology'. From a broad perspective, Financial technology (abbreviated as Fintech or Fintech) is the integration of technology by financial services companies that aims to offer more efficient financial services to consumers. Fintech start-ups can deliver better solutions compared to traditional financial institutions. However, those Fintech start-ups often face the risk of failure. We therefore aim to better understand which critical factors influence the Fintech start-ups to achieve successful exciting outcomes. By recognizing the pattern of successful existing outcomes and following the same trajectory, we can use our research to help the Fintech start-ups to better understand how to use the right resources to reach the exits and build a more productive Fintech start-ups ecosystem.

– by James Ellis (ESR and currently PhD candidate at Institute for management research Radboud University, The Netherlands) –

Defining Fintech

It's a fairly predictable pattern: [concept] arrives in a place of scrutiny, nobody knows what its boundaries are, [person/group/discipline 1] makes a solid attempt, [person/group/discipline 2] makes a convincing counterargument, the cycle continues ad nauseam and/or until everybody seems to just adopt the definition that works best for them in the current context. It happened with the idea of a European continent (which you might think is separate from Asia), it happens chronically with art (caution: that is a playful Buzzfeed link; a more serious line of discourse can be begun here), and as a matter of fact, it's even happening to you. Yes, you.

In a way, it's a very useful process that tests our societies' epistemological health. The process, in any case, should not be leapfrogged with the belief that skipping it is useful. Indeed, good things come from these discussions, though it is quite a nuisance for those who want to have immediate plug-and-play conversations about the topic where everybody knows without question what they mean. That being said, I argue that, despite the instinctive tendency to rush for a universal definition, this is not the most efficient use of brain-power when it comes to new, shiny concepts – concepts such as "Fintechs."

A portmanteau of "financial technologies," it might at first glance seem like a very simple concept to grasp. "Technologies that let me pay for things," you might posit. Yes, but rarely does a technology alone handle your payments cradle-to-grave. This process is often broken up into different pieces. Therefore, is the company that produces the RFID reader in a contactless payment terminal a Fintech? Maybe; maybe not. This example is one drop in an ocean, but it makes immediately apparent how murky these waters can get. However, the term is ripe for discussion in many circles and some sort of shape must take form in defining what, exactly, a Fintech is.

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Bounded rationality dictates that we draw the line in a place that makes sense for the current discussion. And yet, powerful players in different domains have rushed to establish what seems like universality in their suggestions. In no unclear terms, the dedicated Fintech Weekly says that companies which engage with finance-related software qualify as Fintechs – apparently the hardware side is not part of the club; Merriam-Webster obfuscates this delineation but distinctly points the moniker at products and companies – conspicuously excluding services (such as peer-to-peer financial transacting); Bloomberg opens its gates to "financial-services companies using the Internet, mobile phones, and the cloud", diving deeper into Merriam-Webster's pigeonhole and summarily ignoring that the analog history of Fintechs that predates the digital age by far (what, after all, was a ledger if not a financial technology?); PwC attempts to take the holistic, conceptual approach, to no apparent, pragmatic utility.

While these agents and many, many more very boldly stick their flags in whatever patch of definition-assigning land they can, we've been luckily spared from any one of them saying "my definition is the most valid" – yet. It's very likely that each organization that stakes a claim in defining this term has its reasons for doing so exactly where it chooses – I would argue that it's what makes the most sense for the conversation at hand. Many will likely try – hard – to muscle their definition ahead of others, and let them waste their energy but pay it no serious mind. "Fintech" as a term will constantly shift in meaning. Why? Because it has the convenient quality of being steeped in the realm of digital technology, and the beautiful thing about digital technology, and specifically the way it innovates, is that just when you think you've found its limits and how to handle it, you haven't.

Now what does this mean, this broad set of definitions on one of the core phenomenon under observation under the research scoping of the FINDER project? It means that there is ample leeway for exploration. It also means in terms of direct implications for central bank policy as well as for new Fintech's scouting for scaling momentum, that there are many organizational ad stakeholder leavers to take note of when charting a future course of direction. Well-established financial institutions such as Deutsche Bank, ING and Barclays, coexist with small players that have still to reach a national platform or are even still operating in underground modus as they scout for the right moment to take off. And how do big tech companies such as Google, Meta Platforms Inc. and Atos lean into this landscape? This report sets off with some reflection to set the scene for such analytical reflections. Next stop: business ecosystems.

Ecosystems: a new perspective on organizing

Business or market ecosystems have gained significant focus in management research as a counterpart to the more widely understood concept of networks. They are not too different from their ecological namesakes: both are composed of a generally chaotic and unplanned mix of ecosystem participants, among which prey-/predator-like relationships emerge based on which party has superior power, access to resources, and so forth. Scholars such as (Jacobides, Cennamo, & Gawer, 2018) further specify that in business ecosystems, interacting participants are typically of a non-generic nature (in other words, the functional connections they make are specific to their respective goals, and are generally hard to replicate

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which is what the value of their collaboration is derived from), and (Shipilov & Gawer, 2020) further compare ecosystems to networks by calling attention to that networks are often planned, in terms of their composition and directional flow of resources, by a central party. In ecosystems, however, a regulator or industrial association may oversee the collective and determine acceptable patterns of organizational behavior, but it is largely up to each ecosystem participant to best leverage their advantages and secure their shortcomings for their own survival. We will cover this topic further on.

In that sense, ecosystems are differentiated from networks through their modular fashion. Such modularity is key for ecosystems as it prevents an overdependence on single participants (Dhanaraj & Parkhe, 2006) thereby ensuring the fulfillment of the ecosystem's set mission - its value proposition - by preventing failure through e.g., the withdrawal of a participant or an overconfident assessment of a participant's usable capabilities.

Ecosystems require a joint activity that warrants coordination across a rather broad spectrum of players, incumbents, policymakers, investors and startups in the Fintech sphere alike. Orchestration here comes in the picture.

Orchestration

Orchestration in the realm of innovation networks can take different meanings based on the area it is deployed. We offer here two similar but yet distinctive definitions, namely (i) resource orchestration, and (ii) ecosystem orchestration.

(i) Resource orchestration: to achieve competitive advantage, managers have to decide to effectively structure, bundle, and leverage the available firm resources. Resource orchestration therefore intermarries two areas of decision-making. The first, resource management, is focused on stabilizing, improving, and pioneering capabilities as these are the firms' fundament to achieve competitive advantages. The second, asset orchestration, is focused on the decisions revolving around the deployment - in form of investments and divestments - of resource investments (Sirmon, Hitt, Ireland, & Gilbert, 2011).

(ii) Closely related to the topic of ecosystems, (Dhanaraj & Parkhe, 2006) explored orchestration as a focused arrangement by a hub firm of other firms' services/offerings, such that the total constellation's value is greater than the sum of its parts. It is off this "extra" value that the orchestrator siphons value for its own purposes. Well-known examples of orchestrators are Apple, which orchestrates the services of its app store contributors, or Phillips, which orchestrates third-party services to its Hue smart lighting technology. The concept is not too distinct from supply chain management, such as that which Toyota engages in among its many parts suppliers in the journey towards a finished automobile, but the difference is that orchestrated companies should be unrestricted in terms of their freedom and availability to engage in other firms' orchestrated endeavors; single-client suppliers typically do not have this range and can instead be thought of as semi-permanent emplacements in another firm's product journey.

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With orchestration in the context of innovation defined, such coordinated efforts can have direct governance implications for any of the players operating in the Fintech business ecosystem. Corporate scope decisions come to the fore, such as mergers and acquisitions, alliances, and divestitures. Each of those, have the potential to create or destroy enormous amounts of shareholder value to the company at hand. The right scoping decision can significantly impact operating performance for better or for worse, and thus potentially imposes major organizational consequences on companies. As such, these kinds of decisions are often key discussion points in top management team meetings and in corporate boardrooms for any party operating in the Fintech domain. The FINDER project has reflected on various of these scoping decisions, with special attention being paid to the exogenous growth decision of a merger or acquisition.

Merger / acquisition

Mergers and acquisitions (M&As) refer to firms purchasing other companies (acquisitions) or combining two or more firms into new business entities (mergers). From a strategy perspective, they represent a tool for company growth, often described as in-organic growth. However, other streams of literature also suggest that companies acquire to build new capabilities or resources, e.g. manpower and knowledge, extend geographical reach, eliminate competitors, facilitate strategic positioning, or because of managers' personal objectives. While research largely suggests that M&As fail to deliver shareholder value, they are still a common phenomenon observed in business. As such, industries that are more mature usually undergo a phase of consolidation where companies merge and acquire. Similar to such so-called M&A waves, firms may not only perceive acquisitions as a one-time deal but an activity embedded in a broader program of scoping their growth. M&As have two immediate implications for the Fintech industry. Firstly, banks with excellent access to capital can easily acquire new Fintechs. However, the target selection and due diligence play a crucial role in the risk assessment of a deal for banks. Secondly, Fintechs themselves can merge and acquire to expand their regional footprint, build more complete portfolios or become large enough to be a credible partner to larger companies. As such, it is up for discussion if M&A can be regarded as a business model in its own right and if it's sustainable. What constitutes a business model, and what determines its sustainability?

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(Sustainable) business model

The term business model is increasingly used in various contexts to explain how any venture achieves the necessary means to exist. It can be defined as a system that solves the problem of identifying who is (or are) the customer(s), engaging with their needs, delivering satisfaction, and monetizing the value. Hence, the term not only covers how firms make money, but also offers a procedural description of all steps involved in the value creation. While business models have always been an inherent feature of business, it is used more frequently in recent years to illustrate how digital solutions change the nature of making business. As with any business, there is something at stake and there are stakeholders. Let's define the latter.

Stakeholder

The oxford dictionary defines stakeholders as persons for whom it matters how a particular company behaves due to their interests, listing examples as shareholders, employees, customers, and suppliers. This definition can be expanded beyond individuals and to collections of individuals: stakeholder organizations. With regard to Fintechs' stakeholders, however, also are the firms which don't hold an active stake. While established incumbents don't typically hold an active stake they nonetheless are important stakeholders. From their perspective, Fintechs business model can threaten their position. Thus, active monitoring - even leading to potential alliances or acquisition - makes them stakeholders of Fintech ecosystems. Are stakeholders by definition teammates, or competitors, or could they be both?

Coopetition

Coopetition is broadly defined as a hybrid activity in which firms compete against and cooperate with each other at the same time, regardless of whether the relationship is vertical or horizontal (Bengtsson & Kock, 2014; Bouncken, Gast, Kraus, & Bogers, 2015). Coopetition can occur between different actors and activities (Pfeffer & Salancik, 2003), within a firm, a dyad (Wilhelm, 2011), a network or between multiple levels of firms, and can vary in intensity and time (Ansari, Garud, & Kumaraswamy, 2016).

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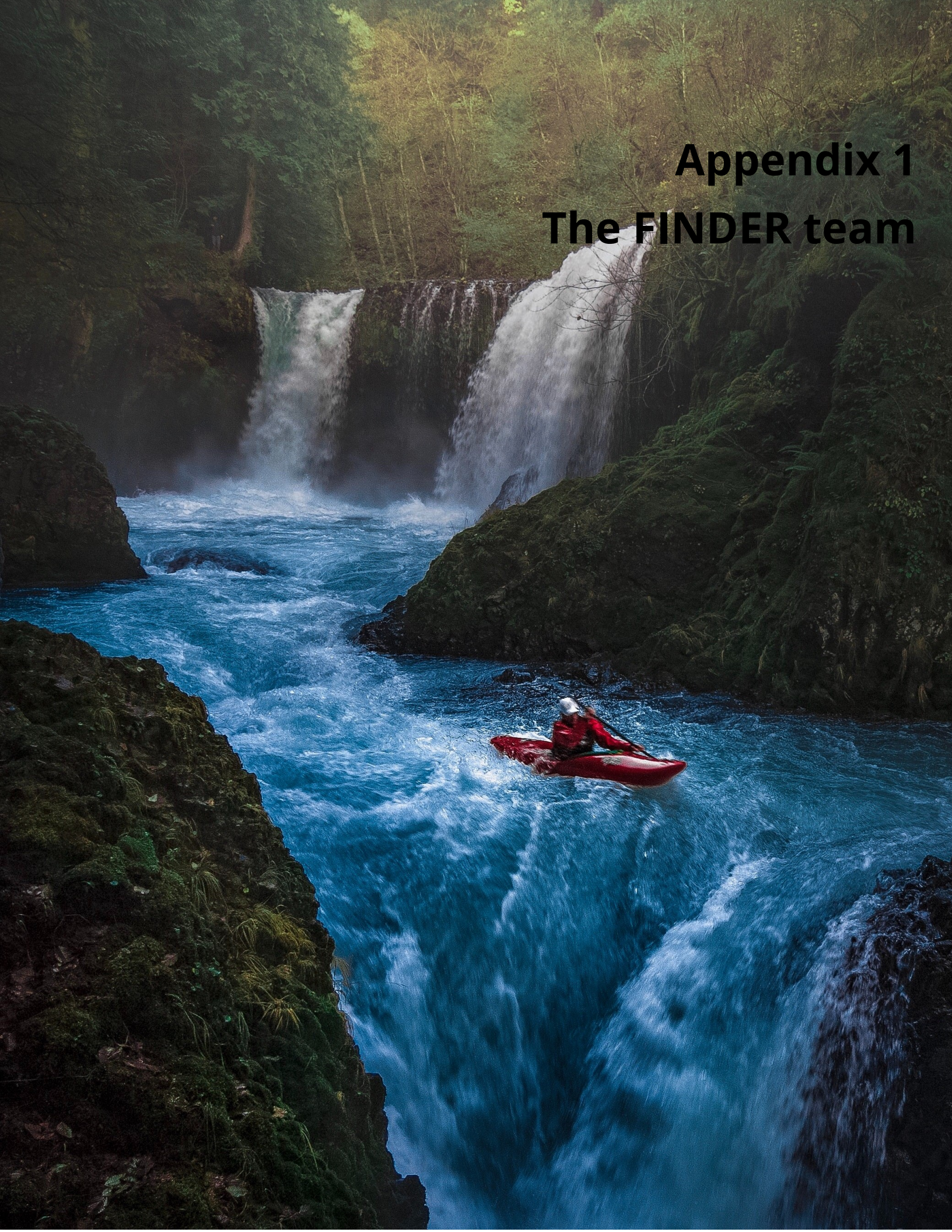
Appendix 1
The FINDER team



The core project team comprises of the 4 PhDs together with a wider team of academics and industry professionals. We gladly take this opportunity to introduce you to them.

Principal investigators

Rick Aalbers is a Full Professor Corporate Restructuring & Innovationat the department of Business Administration of the Radboud University Nijmegen, The Netherlands. He has been a visiting scholar at Imperial College London, National University of Ireland at Galway and The Tokyo Institute of Technology. Prior to his academic career, he worked as a Manager at Deloitte Consulting where he advised on strategic change in the financial services industry. A native of The Netherlands, he holds a Masters degree in Business Administration from Rotterdam School of Management, a second Masters degree in Business Economics (cum laude) from Erasmus University's School of Economics and a PhD in Business and Economics from Groningen University. His work has been accepted for publication by leading international journals, including *Harvard Business Review*, *Research Policy, Long Range Planning, Journal of Product Innovation Management, MIT Sloan Management Review, Journal of Engineering and Technology Management, Journal of Business Strategy* and the *British Journal of Management*, among others. A monograph on Innovation networks appeared with Routledge in 2015.

Remco Neuteboom is the Senior Vice President, Chief Digital Officer, Global Financial Services at Atos. Alongside his team of industry directors, Remco works on major digital transformation projects in Financial Services. Remco's particular areas of focus include Customer Experience, Operational Transformation, Trust & Compliance and Business Reinvention — ranging from developing new data-driven business models through to Cloud strategy. He is also responsible for the Atos Group Fintech strategy and go-to-market approach to working with innovative start-up companies, including the Atos Global Fintech Program.

Co-investigators

Ivo Luijendijk is Atos Group Industry Director Data Analytics and Emerging Technologies – Global Financial Services and member of the Scientific Community. Ivo is a business technologist with over 20 years of experience in bringing technology driven innovation into the business of his clients. His natural drive to understand and demystify complex topics is a constant in his career, where he helped clients make the changes they needed with the help of technological innovations as they emerge. After 15 years' experience as a banking consulting, Ivo now drives business reinvention for the Atos global financial services clients.

Dr Saeed Khanagha is an Associate Professor of Strategy at VU University, Amsterdam. He is a former ITN ESR, and has received his PhD from Erasmus University Rotterdam. He has been collaborating in a number of research projects with several multi-national companies, including Ericsson, Intel and Phillips. His research is focused on organizational capabilities for managing emerging technologies and new business models for the digital age. His research has been published in outlets such as *Journal of Management Studies, Long Range Planning* and *R&D Management*. He currently serves as organizer and guest editor of a Long Range Planning special issue entitled Strategizing in a digital era. He has co-organized several events, including two extensions to SMS annual conferences in Stockholm (2015) and Amsterdam (2018) and three panel sessions that bring practitioners and scholars together in interactive settings.

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Governing board members

Olaf Badstübner (Supervisory Board) is Atos' Global Director Financial Services in Frankfurt, Germany and member of the Scientific Community. Olaf is heading the strategic go-to-market of Risk, Compliance and Regulatory Reporting. He is a deeply accomplished and agile market strategy & business development executive with strong international management experience and a proven track record in banking for almost 20 years. Prior to Atos he served as Director at Siemens with responsibility of financial services clients. He also served as Management Consultant at Siemens with strong focus on banks. Olaf is a graduated engineer (Dipl.-Ing.) in Information Technology of Ilmenau University of Technology and started his career at a German bank in 1996.

Thomas Beattie (Supervisory Board) used to be an investment banker and after consulting to startups for several years, he saw a prototype of Voleo. Based on this concept, he developed a social trading platform that makes it easy for anyone to start investing by pooling their money and building teams with friends and family. Thomas became Voleo's CEO and has been and continues to educate and inspire the next generation by delivering tools that enable them to make better decisions with their money. He has devoted time across several sectors and spent over 15 years leading projects in financial services, capital markets and real estate. Thomas is passionate about making opportunities available through technology (financial and technology innovation, Fintech, AI, Investment, Wealth Management, Real Estate)

Daniel Cohen (External Advisory Board) spent over 30 years leading multi-disciplinary and cross-cultural teams in global firms addressing the areas of Financial Services, Public Sector and Scientific & Technical Computing. Up to November 2021 Dan was SVP & Practice Lead – Banking, Finance & Securities, North America at Cognizant. Before he joined Cognizant, he worked at Atos as the Group Senior Vice President – Global Financial Services, where his main focus was leading the continual transformation of Atos' full product and service portfolio, with an emphasis on industry orientation and relationship management within Financial Services. Overtime, he has amassed a wide range of skills relating to people management and cultural change through internal and external relationships following direct and general management roles. In his 30 years with IBM he also spent time on five international assignments that took him to Europe, Asia Pacific and South America. Dan's pro-bono work has spanned many different organizations across the globe, including board level involvement at The International School of Beijing, The Princes Trust – Edinburgh, and Chemocare – New Jersey. Dan holds a Bachelor of Science in Chemistry from Emory University.

Prof. Dr Hans van Kranenburg (Supervisory Board) is full professor of Corporate Strategy at Radboud University Nijmegen, Nijmegen School of Management, the Netherlands. He is head of the Strategic Management group at the department of Business Administration. He was a visiting scholar at Department of Politics and International Relations, Reuters Institute and GreenTempleton College at University of Oxford (UK), Media Management and Transformation Center at Jönköping International Business School (Sweden), University of Navarra (Spain) and the University of Chicago (USA). Hans published on strategic behavior of organizations, industry dynamics, alliances and networks, foreign direct investments, non-market strategies and stakeholder management. He also is an expert in media management and economics. Furthermore, he

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advised companies such as publishing and chemical companies on strategic and anti-trust issues. He is member of the editorial board of Journal of Media Economics, International Journal of Media Management, and Journal of Media Business Studies. He has published books, chapters in books and in international journals.

Prof. Krsto Pandza (External Advisory Board) is Director of Research Impact and Professor of Strategy and Innovation at Leeds University. His areas of expertise are found in Strategy process; corporate innovation; disruptive innovation; technology innovation; organizational theory. Krsto holds a PhD in Manufacturing strategy, MSc Manufacturing engineering and MEng Mechanical engineering, all University of Maribor, Slovenia

Dr Sebastian Schäfer (Supervisory Board) is the Managing Director TechQuartier. Sebastian is a Cambridge-born behavioral economist and innovation enthusiast. As entrepreneur and lecturer, he has been engaged in building a dynamic startup scene in the Metropolitan region for many years. Prior to founding TechQuartier, Sebastian was head of Goethe University's Business Incubator and research fellow at the Management and Microeconomics department. He lectures at Goethe Business School and is associated with the Center for Leadership and Behavior in Organizations and the Frankfurt Laboratory of Experimental Economics at Goethe University.

Mike Schavemaker (External Advisory Board and ESR supervisory team member) is Transformation lead for Royal Philips in the areas of Innovation and Digitalization and AI. He drives and supports both within Philips as well as with external companies to identify new areas of growth, supports decision-making processes in the front end of innovation and facilitates in creating innovation roadmaps. He particularly has specialized in Artificial Intelligence and Open Innovation and has a track-record in mobilizing and engaging crowds for breakthrough innovation purposes or breakthrough organizational change. Mike holds an MSc in Innovation and Technology from Erasmus University Rotterdam and Nanyang MBA, Singapore and an Executive Master of Business Innovation at the TiasNimbas Business School. As member of the FINDER Advisory Board, he counsels the FINDER PhDs with his industry and academic expertise and is an active contributor to the community.

Ir. Jo Sevarts (Supervisory Board) is the senior Vice President and Group Head of Insurance Industry at Atos, as such global leader of the Insurance sector. Jo is leading multi-disciplined and cross-cultural teams in ICT industry for more than 25 years and has deep knowledge and expertise of Banking, Insurance and Pensions. On top of his mind is ensuring high customer satisfaction and creating added value with innovative solutions. He has strong capabilities in people management and is always focused on developing long-term relationships with clients and partners. Jo obtained a Master of Science degree in Information Technology from Eindhoven University of Technology and a postgraduate degree in Leadership from Glasgow Caledonian University.

Chris Vialle (External Advisory Board and ESR supervisory team member) is Partner within Monitor Deloitte | Deloitte Consulting, focused on Strategy, Analytics and M&A within the Banking, Payments and Fintech sector, based out of Copenhagen. He serves senior leadership within Financial Services in developing

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strategy, addressing strategic issues and realizing transformational change. He is currently focused on the Nordic region, serving clients across Norway, Sweden, Denmark, Finland and Iceland. Before joining the Nordic practice, Chris was part of the Monitor Deloitte Strategy practice in New York, and in Amsterdam, serving clients across North America, EMEA and Asia. He holds a Master's Degree in Information Sciences (MSc) and in Business Administration (MSc) at Radboud University in Nijmegen. He is guest lecturer Corporate Strategy and has a publication in *Ivey Business Journal.*

Dr Miriam Wilhelm (Supervisory Board) is a professor of sustainable supply chain management at the Vienna University of Economics and Business. Miriam received her PhD from Freie Universität Berlin in 2008. Prior to joining academia, she decided to work in the private sector. She developed internal training programs for Volkswagen AG before starting her academic career at the University of Groningen (NL) in 2010. Miriam Wilhelm spent research stays at universities in Tokyo, Melbourne, Duisburg-Essen and Gadjah Mada, among others. Since 2020, she holds a professorship in global supply chain management at the University of Groningen. Her award-winning research work combines insights from supply chain management, international business, and general management. It focuses mainly on sustainable supply chains, the extension of sustainability standards to suppliers, the differences in managing environmental and social sustainability of suppliers, and the role of institutional context in the sustainability of supply chains.

Angela Chinnoe (Supervisory Board) is attorney at law and partner at Schellart Advocaten, specialized in labor legislation. She holds a master in law (LLM from the University of Amsterdam and graduated from the Postdoctoral Grotius Academy. Angela is also an Industry Member of Radboud University's Centre for Organization Restructuring. Her experience as an employment lawyer abridges legal advice to private individuals, trade unions and employers, covering, ranging from litigation on the right to strike to pension provision.

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ESR supervisory team members

A co-supervising team from business and academia involved on the various subproject streams

Prof. Dr Koen Heimeriks is a Professor of Strategy at Warwick Business School. Previously he led a faculties at Copenhagen Business School, Rotterdam School of Management as well as Tilburg University and he has also been visiting at Aalto, Carnegie Mellon University and INSEAD. He earned his PhD at Eindhoven University of Technology. Koen's research focuses on how companies develop corporate development (i.e., alliance, acquisition and divestiture) capabilities to realize corporate growth in high-tech settings. His work features in numerous top journals, including Academy of Management Annals, Academy of Management Journal, Harvard Business Review, Journal of Management Studies, Organization Science, Strategic Management Journal, and Strategic Organization. Besides his research, he trains, consults for, and works with executives at publicly listed and large private firms operating in volatile settings, e.g., high-tech and chemical industries with a focus on corporate development and entrepreneurship, strategy, organizational change and growth strategies. Both his research and teaching won him prestigious international prizes.

Frederik Kerling – Head of Fintech and Quantum industry Director – Global Financial Services and member of the Scientific Community. Frederik is a Senior Quantum Expert with a background in theoretical physics specializing in Quantum engineering who has since made the transition into consulting, cybersecurity, and finance. Frederik teaches courses in quantum and cybersecurity at multiple universities and work in business and patent development. He specializes in bridging the gap between complicated technologies and realistic commercially viable business outcomes. After 8 years of experience as a cybersecurity, innovation, and quantum consultant, he is currently heading the Fintech Engagement program with Remco Neuteboom.

Dr. K.J. (Killian) McCarthy is an Associate Professor of Strategy (Tenured) at Rijksuniversiteit Groningen, Innovation Management & Strategy – Faculty of Economics and Business. Killian is trained as an economist; he has a BSc in Economics (Cork), an MSc in Economics & Law (Utrecht), a Research Masters in Economics (Utrecht and Vienna), and a PhD in Economics (Groningen). Today he primarily works on topics relating to corporate strategy, but has worked and continues to publish too on topics like money laundering and international tax competition. His expertise is the consequence of (international) mergers and acquisitions on the financial and innovation-based performance of the initiating firm as well as the disciplines of international business, strategic management, innovation and technology management.

Philipp Tuertscher is an Associate Professor of Technology and Innovation at the KIN Center for Digital Innovation at VU Amsterdam. He has obtained a PhD in Management from the University of St. Gallen, Switzerland. Before joining VU Amsterdam, Philipp worked as an Assistant Professor at the Vienna University of Economics and Business, and as a Visiting Scholar at the Pennsylvania State University. His research explores collaborative innovation in a variety of settings. Besides studying large-scale scientific collaborations at CERN, Philipp has been studying innovation processes in crowdsourcing and collaborative online communities such as Linux, Wikipedia, and Threadless. His work has been presented at international

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conferences and published in leading journals including *Academy of Management Annals*, *Organization Science*, *Information Systems Research*, and *Organization Studies*.

Himanshu Vyas is the Chief Strategy Officer – Head of M&A and Strategic Partnerships, Global Financial Services at Atos. Himanshu's current focus is to develop and execute the Atos M&A and strategic partnership-based growth strategy for the Global Financial Services Market. Around 20 years ago, he started his career as a coder for mission-critical real-time systems. Over the years he has worked in India, Canada, the USA and Sweden. Nowadays he works in the United Kingdom with a variety of international responsibilities across business development, sales and operations. Himanshu joined Atos in 2016 in his current role. He holds bachelor's degrees in Computer Science and Engineering from IIT-BHU (Class of 1998), Management Education in Marketing, Finance and Organizational Leadership from the Indian School of Business (Class of 2003) and Harvard Business School (Class of 2015).

Koen van den Oever is an assistant professor at the department of Business Administration (Nijmegen School of Management) at Radboud University Nijmegen. His research is centered around three main topics: interorganizational relationships (IORs), strategic decision-making, and board of director composition. Koen uses a behavioral lens to study when organizations engage in IORs, the influence of board of director composition on the strategic decision-making process, and how different forms of decision-making affect organization's behavior in IORs. Koen took part in the supervision of one of the FINDER ESRs and, as an academic, saw his work published in journals such as *the Journal of Business Venturing Insights, Strategic Management Journal* and *Advances in Strategic Management.*

Jean-Francois Zehner is the Head of the Deal Competence Center in Atos Global Financial Services. Jean-Francois shares his passion for operational excellence to nurture sustainable relationships and mutually profitable agreements with key clients. Jean-Francois is a seasoned executive who masters the challenges of accelerated transformation across large complex organizations. Focused on multi-cultural team management, he insists on carefully planned execution to deliver tangible results.

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Appendix 2
Early Stage Researchers

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FINDER Early Stage Researchers (ESRs)

James Ellis

Project 1: Managing innovation in the networked organization

Mr. S. James Ellis began a career in his home country's military as a broadcast journalist, which took him to the southern United States, South Korea, and Germany to document large, complicated organizational operations in diverse settings and to explore on-the-ground stories of the people who play small but consequential parts in such situations. After six years of this, he completed his Master's degree in Globalization & Development Studies at Maastricht University, conducting primary research on the use of commercial drones among the South African agricultural sector. The output of this research was an understanding of how problematic social divisions can bleed into access to technological innovations – in South Africa's case, preventing those who need cost-savings technologies the most from actually using them, and usually along racial and socioeconomic lines. His current research follows in the same qualitative, people-focused vein of exploring socio-political factors and processes at play in business ecosystems and the collaborative, competitive, and cooperative arrangements that organizations explore for various purposes.

Jonas Geisen

Project 3: Alternative business models in digital ecosystems

Jonas Geisen's academic roots can be traced back to economics. There he started with a specialization in innovation and change. In his master's degree he extended his interest by specializing in behavior and policy obtained from Radboud University. In between his academic education, he gained experience in digitization and digitalization at PwC, where he spent two years conducting projects in the public sector and financial technology consulting. His previous experience forms the basis for his quantitative trajectory on corporate development. Against the backdrop of the question of how companies can sustainably adapt to the structural changes of the digital transformation, this research combines his interest in the study of patterns - in the form of temporal arrangements - and in the high-tech industries that are his data sample. In the context of structural change, he focuses on both intra-firm transformation - through the acquisition and divestment activities that comprise firms - and inter-firm transformation - in the form of ecosystems.

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Jonas Röttger

Project 4: Seizing the future: fostering collaborative entrepreneurship

Mr. Jonas Röttger gained first professional experience as a usability engineer in medical engineering designing and testing user interfaces for intensive care units. After graduating, he completed a business and IT traineeship at equensWorldline where he worked in risk management and security for financial services. Having an academic background in psychology with a BSc in Business Psychology from the Leuphana University of Lüneburg and a MSc in Human Factors from the Berlin Institute of Technology, his research interests focus on cognitive aspects of decision-making. He joined the FINDER project as a PhD fellow investigating decision-making in mergers and acquisitions and firm outsiders' evaluation of acquisition announcements. Therefore, he combines behavioral literature on CEO personality with impression management literature, to investigate how firm outsiders evaluate communication effort in acquisition announcements against the backdrop of the acquirer CEO personality.

Ami Xiaolei Wang

Project 5: Effective strategies and policies for enhanced social payoff, during and after digital transformation

Ms. Ami Xiaolei Wang's research is focused on effective strategies for enhanced social payoff under digital transformation. With this research stream, Ami hopes to add to the empirical understanding of how to design and implement new financial technologies from a sustainability perspective, while bringing massive benefits to the whole society in general. Specifically, Ami's work shed more light on the strategic performance of Fintech start-ups and the economic and organizational mechanisms that drive it. Ami's research interest lies at the intersection of technological innovation and strategy, especially in the context of social benefits through Financial technology. Ami Xiaolei will delve into the integrative approach to Fintech sustainable innovation strategies and study how to develop sustainable strategies in keeping with organizations that could benefit society, during and after a digital transformation. She draws methods from statistical machine learning, applied econometrics, data science, and social network analysis in her research. Ami's obtained a Master of Science degree in Economics from the Texas A&M University as well as a Master degree in Finance from the Smith School of Business of Queen's University.

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Appendix 3
References

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