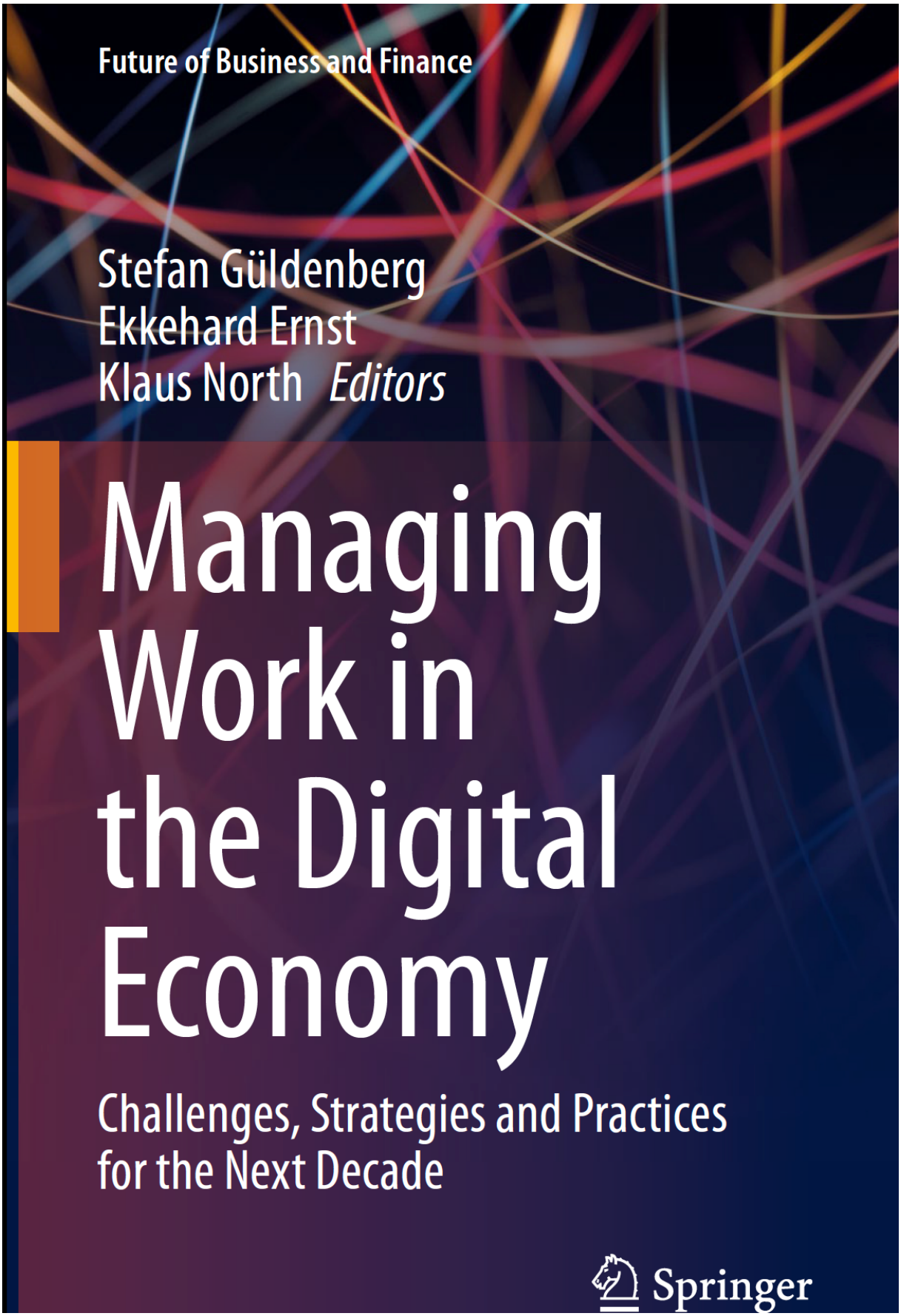

Making Collaboration Work

"Make Collaboration work. How do we work and learn in 2030?"
Dr. Daniel Stoller-Schai

Daniel Stoller-Schai

This chapter focuses on the question, How collaboration will look like around 2030? What will be the role of culture, organization, tools, and people? Technologies are changing the way we work together and what we produce on a massive scale. Physical proximity is no longer necessary for collaboration, dependence on other people also decreases; Intelligent assistants, automated routines, and self-learning structures have become our partners in our daily collaborations. This has opened up new opportunities especially for micro-enterprises and freelancers. Think about it: The same number of people that was used to cultivate a field is now enough to operate a satellite-controlled and networked machine park and can often do so on their own. In the field of cognitive work, we will have similar conditions in 2030: One person alone can execute things that used to require an entire open-plan office to do the same job. Many changes will come about as a result of the shifting attitudes amongst employees, particularly as new digital-savvy generations enter the workforce and bring with them their own notions on communication and collaboration.

However, what is meant by collaboration? Collaboration is defined as the direct and mutually influential active confrontation of two or more people, oriented towards common goals, to solve or master a task or problem. This takes place within a jointly designed and negotiated, computer-mediated context (common space of meaning, cooperative setting) and using common resources. (see Stoller-Schai 2003|2019, S. 45).

The topic “Making Collaboration work” is developed in 4 parts: In part 1, we look into the year 2030. For this purpose, we look at the everyday life of the young data specialist, Nadire who works virtually as well as face-to-face in different contexts and with people from various countries. In part 2, we look back: Where did this all come from and what were points of departure to established norms? The future Collaboration Landscape will be introduced as part 3. Here the question is explored, What have we undertaken in schools, companies, governmental organizations and globally in the last 10 years to develop collaborative competence on individual and organizational levels that became a decisive competitive factor in 2030. The final part addresses the question, Which steps do we have to undertake in the coming years to achieve the realization of the “Collaboration Landscape 2030” (see Chap. 3.1)?

Let us first watch a working day of Nadire 2030.

1 A Day in the Life of Nadire 2030

Zürich (Source: DigitalTag.Swiss 2019)

Nadire is a young data specialist whose grandparents immigrated two generations ago from Turkey to Switzerland. She studied in London, now works in Zurich, where she lives in an international community, who by nature are globally networked through cultural ties and today’s work culture. Collaborative work in different virtual contexts is quite normal for her and so is working in different physical locations face to face.

07.00 AM
It's 27 March 2030, Nadire wakes up and spins around on her futon once more before preparing a fresh green tea in the kitchen. Zurich has grown in the last 10 years. At its core, the city has been compacted and the agglomeration has also been expanded. Surprisingly, however, there has not been a traffic collapse. Since the Corona crisis in 2020, home office, remote work and digital collaboration have spread virally. In addition, many people have sold their cars, switched to car sharing, to e-bikes and e-scooters or to self-flying vehicles. All this has calmed the traffic situation. Nadire briefly checks her body readings on a large windowpane, which gives a view of a green inner courtyard. With just a shouting, the large windowpane becomes a screen on which all her bodily readings are made visible. Using eye contact, Nadire moves the individual blocks of information around, coming from a body chip, which she had inserted under the skin of her forearm. The chip gives her continuous feedback on her most important bodily functions and displays them on the windowpane, or on the device which is closest to Nadire at the moment.

08.00 AM
Time to meet others for the daily meeting. Every day the team meets at a different team member's place. Today it's Nadire's turn. The other team members are represented as holograms and take a seat at Nadire's dining room table. A short check-in gives the opportunity to make small talk. "The weather is a perennial topic," Nadire thinks, "the subject will probably always be topical." After the check-in, all team members give a short update on where they stand with their work. Again, the large window front in Nadire's apartment serves as a screen for everyone. The 7m x 2.5m area offers enough space to place all the essential facts, pictures, graphics and films so that everyone has a clear overview of things. The team consists of three groups, divided into three large time zones. The morning meeting always brings together the EMEA and APAC parts of the team. Although English is still the standard language of communication, each team member is always able to express themselves in their national language, even in their dialect, in order get the feeling of having expressed themselves clearly on the matter. The collaboration infrastructure translates any language directly and into the desired target language. In this way, misunderstandings have been significantly reduced and the understanding of intercultural nuances has grown.

09.00 AM
After the Daily Meeting Buana from Indonesia and Nadire stay on. Just a few years ago, they had each met through data glasses in a virtual 3D room. Since this function has been integrated into a lens, this possibility is available at any time and can be activated by calling up the function. Buana and Nadire connect their infrastructures in this 3D space so that they can continue working together on their project. They are in the process of designing molecules for new drugs and are moving around molecule chains for this purpose. By moving their hands, they can change the scale and thus either immerse themselves in a molecule or view the entire context from a distance. This form of collaboration is very intensive and after an hour they say goodbye. They are satisfied with the level they have reached and have managed to initiate the production of a molecular chain. They now leave the further work until the next meeting to an idea development algorithm, which moves their idea further independently.

10.30 AM
Nadire leaves her apartment for a short walk in the nearby park. She goes into offline mode and closes all communication connections. It is important to her that she can literally dive off once or twice a day and be on her own. In the park, she always goes to a teahouse at the end of her walk. Sometimes she meets an older lady there, with whom she likes to talk. Mrs. Walter is 70 years old and tells her about her childhood in the 1960s when there were no computers, no smartphones and no internet. For Nadire, these are stories from another world and she can hardly imagine that one could have ever lived like that.

12.00 PM
Back at home Nadire prepares lunch for herself. She is a member of a neighborhood garden project that uses empty spaces on flat roofs to grow vegetables, berries and fruits. From this production Nadire receives a box of fresh vegetables every now and then. Today it is eggplants that she processes into a gratin. Sometimes the two IT students from the flat next door come to visit for lunch. They are also studying data science and can benefit from Nadire's experience and her networks. Today they are talking about the services they want to use to set up their own business in a year's time. The innovative power of the start-up scene in the early 2000s has meant that many people are

now self-employed and can quickly form flash organizations for projects, where they complete a job together and then separating again. The social security and tax systems had to be adapted for this. Social security benefits and taxes are calculated according to a simple pay-per-use principle. For the billing of the project work to the individual project members, the services are mutual and mutually evaluated and a distribution algorithm automatically distributes the fee to the accounts of the members according to a consensus decision.

01.00 PM
In the afternoon Nadire starts the quiet working phase, at least for about 2 hours. She dictates new ideas to her digital assistant, which are automatically transcribed, summarized and indexed. She draws other ideas with a virtual pen on her universal windowpane and turns them into a 3D object as required. She reads her curated news from various data sources or switches on a live stream for more details.

03.30 PM
Today was a good day: 2.5 hours of work in peace - that doesn't always happen. Now Nadire is ready for real contacts. She leaves her apartment again and rides her e-bike on well-built cycle paths directly to her favorite co-working space. These were created from 2020 onwards and have developed into local work centers, bazaars for exchange, workshops spaces, makerspace sessions and much more. Nadire meets a new client and two colleagues (Sue and Jana), with whom she has already worked on numerous projects. The four of them retire to a “huddle room” and discuss the assignment. Via app, Jana orders a round of coffee for everyone and after 10 minutes it is brought by Bobby, the barista robot. The project idea takes shape, the tasks are distributed and the budget is discussed. After the client left, the three women stay together and discuss the next operative steps and set up a virtual project space.

06.00 PM
Nadire is going back home. Markus, her boyfriend, is waiting for her there. He works for a large machine manufacturer and is responsible for sales in the USA. He has already prepared a light dinner. Nadire meets briefly for her "Lately", as she calls her daily meeting with her American colleagues. Markus stops by and says "Hello"; in the meantime they know each other and Markus has already been able to use Nadire's contacts for his American sales tasks. At 6.45 p.m. it is over and Nadire and Markus treat themselves to a cozy dinner and a glass of red wine. They talk about their next holidays. They want to go to Indonesia. Nadire finally wants to get to know her team colleagues, with whom she has been working for 2 years. Markus is interested in the country, the culture and the language. Since a few weeks, he is learning the Indonesian language with his AI tutor. Automated translations are quite practical - but learning a language by yourself and being able to speak it has another quality.

08.00 PM
That's it for today. Nadire does not want to talk anymore and watches a series in 2D in a very trivial way. Markus reads a book. He loves the haptic experience, the weight and the smell of a book, even if it seems very anachronistic in 2030. It is important to him to do things in a completely analogue way, as a counterpoint to his mostly digital work. That is why he likes to work in a wood workshop on weekends and improve his skills in furniture making with solid wood together with others. Meanwhile, some objects have been created for Markus' shared apartment. Nadire thinks it's great and likes to sit in a lounge chair made by Markus, especially in the morning at the "Daily".

22.30
Nadire goes to bed, Markus joins a little later. Nadire takes a quick look at the automatically curated daily summary on her tablet and checks her body values: she has taken 11'000 steps today - not bad. She is satisfied with the day and falls asleep.

2 A look back: Where did we start in 2020?

Pandemic 2020 (Source National Geographic 2020)

The aim of this chapter 2 is to describe the initial situation in 2020. Where did we stand in terms of collaboration? What had we already achieved? What were we proud of and didn't want to lose? What were our predictions for the skills we would probably need in the future to work collaboratively?

The year 2020 was marked by the Corona crisis. Thousands of people died worldwide. The only effective measure against the spread was social distancing. This led to people being sent home, entire cities being quarantined, schools being closed and companies and shops being forced to close. Suddenly the only way to communicate was via the Internet and mobile networks. Schools had to switch immediately to home schooling and businesses to home office work. After a short period of shock and when the message was accepted to really stay at home, a creative and solidary push started on four levels:

- **Mind -** In 2020 a new attitude and a new view of school, the world of work and the home office developed.
- **People -** There was a new assessment of the value of analogue and digital encounters.
- **Organizations-** There was more discussion about leadership and new organizational models.
- **Machines -** The Corona crisis led to new experiences with digital tools and intelligent systems.

Mind

A new attitude and a new approach to issues such as social vulnerability (Fragility), questions of sense and purpose (Purpose) and, in general, questions of the ethical foundations of a digital network society (Ethics) developed.

Fragility: Perhaps the most important finding of the Corona crisis was a new global awareness of the fragility of economic and social systems. Not because one did not know this before, but because it has become obvious and tangible for many. At the same time, there was a great deal of solidarity, leading to numerous creative initiatives such as the Versus virus hackathon in Switzerland in April 2020. LinkedIn further established itself as an important platform to exchange experiences and to get to know new events, ideas and other people.

Purpose: Many things were questioned. Why do we actually travel around so much when so much is digital? How do we have to prepare ourselves so that we are ready to continue working and generating revenue even in a pandemic? What will we use our attendance time for in the future when we meet face-to-face? What competencies and skills do we need so that we can better work together virtually in the future?

Ethics: A rethinking of digital ethics also took place. If we are increasingly working together --and perhaps in the future especially digitally-- then we will have to establish rules and measures for data security, protection of personality and intellectual property. A study by Gartner stated: "Legislators and companies must clarify ethical issues surrounding the use of AI, in particular "emotional computing" (analyzing the feelings of a human counterpart) moves in a grey area in the EU" (see: https://www.cio.de/a/gartner-nennt-5-megatrends-bis-2029,3606088).

People

With regard to the comparison between machine and human capabilities, the following topics came to the forefront: awareness of typical human strengths (value judgement, self-directed goals, creativity, handling dilemmas, intuition, dreaming, imagination, abstraction, empathy etc.), the value of shared experiences and the importance of exchanging, both in analogue and digital form.

Potential: Another insight, already from the year 2015: the ingenuity of machines and the ingenuity of people. Colvin (2015) already pointed out in 2015 that we often underestimate ourselves in the face of the possibilities of intelligent machines. Humans have the ability to adapt flexibly to all environmental changes and they will further increase their possibilities when working together with digital assistants and robots. Emotional intelligence, empathy, lateral thinking and intercultural competence became important values.

Presence: But the Corona crisis also showed: We want to see and experience how each other live: Before and after the crisis, a real boom for presence-oriented learning and working forms began. Working out Loud (Stepper 2018), Liberating Structures (Lipmanowicz | McCandless 2018, Steinhöfer | Weinert 2020), Design Thinking (Lewrick 2018, Lewrick et al. 2018), Lego® Serious Play® and Eigenland® are just some of them (for a detailed overview: Stoller-Schai 2020a). Further Makerspaces were set up and Co-Working-Spaces were opened to collaborate directly with each other.

Exchange: With Meetup Groups, LinkedIn Networks, BarCamps (Muuß-Merholz 2019) and Co-Working Spaces, the willingness to share and collaborate across company boundaries increased. Co-creation became an important trend. With these forms of creative exchange, the boundaries between experts and non-experts became blurred. Depending on the role and setting, everyone was once an expert and then again, a non-expert. In the spirit of the Holocracy (Robertson 2016), the person who was currently best suited to take on a role or task was always.

Organizations

2020 was also the starting point for a strategic rethink of the home office and in regard to remote work in general. Completely virtual companies such as "required" (https://required.com/de/) were suddenly no longer the exotics, but the yardstick for the new normality.

Virtual – Analogue: Virtual leadership became an important development topic in leadership training. Karin Christen, CEO of "required", said: "Virtual leadership is our "default setting. However, for specific topics we often rely on real-time communication with video calls or even meetings to minimize asynchronous communication and thus waiting times and misunderstandings. We use video calls for example for weekly team or planning meetings, job interviews, complicated tasks, briefings or bugs. We do not hire an employee until we have met at least once. We also combine employee interviews with a physical meeting, and for team building we also meet once or twice a year for several days. (Stoller-Schai 2020c).

Cell – Network: The classic top-down organizations with a pyramid structure began to crumble further. New approaches like "BetaCodex" were intensively discussed. Organizations were switched to networks (Bensmann 2018, De Vet and Lowette 2018, Gray 2012) or cell structure design (Pflaeging | Hermann 2019). Organization are organized as cell networks, decisions are made at the periphery of the network, where the contact to the market exists. The core of the network serves to support the

periphery. This is a radical shift away from the classical pyramid organizations, where decisions are made at the top and then executed at the bottom. Large corporations like Novartis started an "Unboss Program". The role of top management and the CEO changed. Decisions were no longer made at the top, but on the periphery. Where the company and associates have direct market contact, decisions were also made on investments, products and distribution.

Flash – Gig: For the implementation of project orders, more emphasis was placed on Flash organization. According to the principle "Build a Team, Do the Job, Say Goodbye" (Scheiber 2017), temporary teams are formed that are made up of experts from all over the world. Matching platforms (e.g. https://www.comatch.com/de/) specialize in bringing companies and consultants together and supporting the creation of Flash organizations.
The gig economy also continued to develop. In order to meet the requirements of social security and tax authorities, new possibilities for accounting, invoicing and social security had to be developed for the numerous freelancers and service providers who did not want to start their own company (GmbH or AG). Companies such as PayrollPlus (see: https://payrollplus.ch) specialize in providing social security and payroll solutions for freelancers and self-employed service providers.

Machines

The Corona crisis led to new experiences with digital tools and intelligent systems. The WebConferencing provider “Zoom” extended the user basis from 10 to 200 million. Virtual Reality and the collaboration in 3D spaces became commonly known. Artificial Intelligence and Deep Learning became two of the most discussed terms.

Zoom & Co: The year 2020 was the year of "Zoom" (www.zoom.us). Hardly any other provider of web conferencing systems was in such a good starting position as Zoom and could offer a stable and user-friendly service. Zoom was used for meetings, distributed workshops, broadcasting, coaching sessions and much more. The Corona crisis led to the realization that digital collaboration is the backbone for collaboration in networked organizations. Teams from Microsoft were offered license-free. Many providers also offered their systems at very low prices. Projects were increasingly managed with Trello, Jira, Monday, Asana or Planner etc. Surveys were conducted with Mentimeter, Surveymonkey or Slido. Communities were started via Slack, Yammer, Facebook, Meetup, Beekeeper or Glowing Blue etc. Information was shared via LinkedIn, WhatsApp, Instagram, Telegram, TikTok or Twitter.

Spaced Collaboration: But there was also a lot happening in the 3D area: BarCamps (e.g. the Corporate Learning Community BarCamp Hamburg 2020, see: https://colearn.de), which should have taken place in presence, were held in 3D worlds (see: https://tricat-spaces.net and Herkersdorf 2018). Entire trade fairs (such as Interpack 2020 or TalentPro) were virtualized and took place completely online. These experiences led trade fair organizers and stand builders to consider the question of which trade fairs and conferences should actually be physically held in the future. Some booth builders went bankrupt in 2020, others understood early on that trade fairs and conferences can also take place digitally and developed appropriate platforms and services.
Collaborative products such as the "SmartBoard", which often stood around unused in companies, were revived by new concepts such as the "CollaBoard". With the CollaBoard (see: https://ibvsolutions.com/de/collaboard/) it was possible to work on a physical board that was digitally networked with the boards of others, thus creating a networked collaborative workspace.

Deep Learning: It became obvious that the gap between the elite of Artificial Intelligence Researchers and users in companies was very wide. New training programs were offered for managers in the fields of data science (e.g. www.dsfm.ch/dsfm) or artificial intelligence. Max Tegmark expressed his hope for this as early as 2016: "Everything we love about civilization is the product of human intelligence, so if we can amplify it with AI, we obviously have the potential to make life even better (Tegmark 2017).

To summarize: The year 2020 was a real turning point in terms of collaboration and laid the foundations for the social, economic and technological developments of the next 10 years.

3 “What have we done to reach where we are today?”

City of the future (Source Volocopter 2020)

3.1 The Collaboration Landscape 2030

This chapter explains the Collaboration Landscape of 2030 and looks at what we have undertaken in schools, companies, governmental organizations, and across regions in general to encourage collaboration, make it work and thus contribute to competitiveness.

The Collaboration Landscape 2030 (Figure 1) consists of four areas. At the center is the collaborative mindset, which drives the Collaboration Landscape from within. The three most important examples are listed for each area.

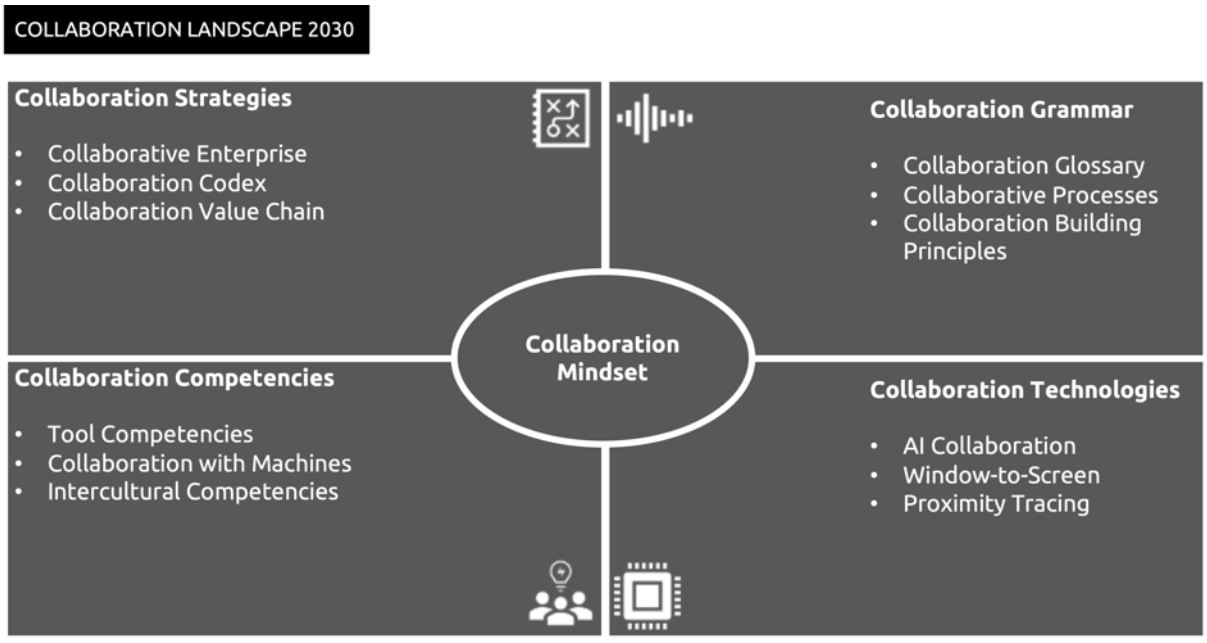

Figure 1: Collaboration Landscape 2030 (Source: Stoller-Schai 2020)

Collaboration Mindset

A collaborative mindset is at the heart of the Collaboration Landscape. Leaders must have an understanding of the importance of digital and analogue collaboration and must have concrete experience themselves. This implies an understanding of networks (Bensmann 2018) in general and an understanding of networked companies (Gray 2012) or organizations according to the cell structure design (e.g. Pfaeging | Hermann 2019) in particular. Leading in the virtual company becomes a central challenge for managers (Stoller-Schai 2020c).

Example
The company FrontRunners (fictitious example) specializes in the creation of digital signatures, which it can apply to all kinds of digital and analog objects. The company is organized sociocratically. Decisions concerning product development are made on the periphery of the company, as it is there that the market is closest. The founders and employees are aware that the company can only flourish if there is open, transparent and creative cooperation. For this reason, all documents are available to all employees. This requires a well-established culture of trust. Where trust comes under pressure because decisions are not comprehensible or because one does not know exactly what the others are actually doing, this is addressed immediately. Everyone knows that an eroded culture of trust is difficult to restore. The principles of cooperation have been summarized in a Collaboration Codex. All employees have signed it. The collaboration culture is also regularly discussed in townhalls, in BrownBag sessions and other events. In this way an understanding and a deep knowledge of collaboration has developed. This also has an impact on the leadership culture. Leadership is always given to the person who is best suited for the current task. Leadership takes place almost exclusively in virtual or hybrid contexts. This means that the people who lead must know how to communicate with their teams and address difficulties. This happens - if necessary - mainly in 1-to-1 conversations. All these experiences and the development of a Collaboration Codex have led to the development of an actual "Collaboration Mindset" in the company.

Collaboration Strategies
The collaborative mindset is the basis for the development of collaboration strategies. A collaboration strategy defines how to collaborate with all stakeholders of a company.

- Collaborative Enterprise: In 2030 the collaborative enterprise is the standard. Product development with customers, collaboration with competitors and fluid company boundaries are the basis for business success.
- Collaboration Codex: The Collaboration Codex defines which channels are used to communicate and collaborate and how.
- Collaboration Value Chain: Collaborative processes are developed along the Value Chain: From social hiring to crowd funding and community marketing to crowd support.

Example
The company "VisitYourDreams" (fictional example) has established itself in the field of eTourism. On a platform, offers for holiday destinations are compiled, which are fed from the contributions of the platform users. The cooperation between the users of the platform is an essential success factor. To do justice to this important factor itself, the company "VisitYourDreams" has converted its entire value chain to collaborative processes.
Market research is solved via a crowd research approach. Instead of commissioning market research institutes, data and user impressions are systematically collected. Holiday reports and photos are evaluated using AI-based algorithms. Holiday films are analyzed for positive and negative impressions using a sentiment analysis and rated accordingly.
Innovation & Design is redeemed via an open innovation approach. There is an open exchange also with competitors and with numerous universities that have specialized in the field of tourism. The financing of new functions is started via crowdfunding. In this way, the users of the platform also become co-owners and identify with the new developments. On this basis, it is only logical that HR management also finds new employees via social hiring. It is sufficient to advertise a position in their own network. The people who then apply are already well known to the company. Prototyping & testing of new products is also solved via crowd testing. The users of the platform test new functions and thus receive bonus points for their next series. The production & manufacturing of new products is then realized via crowd-based manufacturing. Small orders are assigned to the entire network via micro tasking. This enables fast and parallel development. Marketing & Sales takes place in the form of Community Marketing and after sales is also handled by Crowd Support. In this way, "VisitYourDreams" is a living network organism that can quickly adapt to new needs and situations.

Collaboration Grammar

It needs a "collaboration language" to make collaboration work better.

- Collaboration Glossary: The basis for a collaboration language is the glossary. Basic terms like "grounding", "concluding" or "performing" are defined here.
- Collaborative Processes: The profession of Collaboration Designer has become established. They design collaborative processes, discover chessboards, advise and support in complex projects. By analyzing and graphically representing collaboration data, it becomes easier to develop better collaborative processes.
- Collaboration Building Principles: The analysis of data from numerous collaborative processes is used to derive collaborative principles. These Collaboration Building Principles are in turn used to continuously improve the Collaboration Enterprise.

Example
The company SmartAdminstration (fictitious example) specializes in improving work processes and cooperation in administrations. For this reason, they have developed a Collaboration Grammar, which uses AI-based analysis of workflows to show where collaboration can be improved. For this purpose, all activities of the Social Enterprise Network are analyzed, but also the external communication with the different stakeholders. Initially, the employees in the administrations were reluctant to take part. But they quickly realized that the data had been anonymized and that they were receiving confidential and personalized tips that only they could see and not their colleagues. Collaboration Grammar describes how the various phases of a collaboration can be designed. This includes the following five phases: (Stoller-Schai 2003/2019):

1. team building (forming)
2. determine common language (grounding)
3. designing the procedure
4. simultaneous cooperation (performing)
5. reaching conclusions (concluding)

- Recording results (results)
- summative reflection

With this approach, SmartAdministration has succeeded in increasing the understanding of collaboration. The different phases can be described and the data from the daily collaboration show how well this works. Through the personal tips, each employee is individually supported. This increases the efficiency of work and makes better and more economical use of tax money.

Collaboration Competencies

- Tool Competencies: The use of collaborative tools is already practiced in primary school. Collaboration literacy becomes a basic competence.
- Collaboration with Machines: Collaboration with intelligent systems, robots, chat systems, language assistants have become the norm and enhances the abilities of an individual. With a set of intelligent systems, freelancers and self-employed people can solve tasks that would have required entire teams just a few years ago
- Intercultural Competencies: The use of automated language translation makes it easier to work with people from other language regions and cultures. Since cultural nuances are also taken into account, it becomes easier to work with people from completely different cultural backgrounds.

Example

The company LiquidMotors (fictitious example) is a company that specializes in the development of hydrogen-powered vehicles. Various VR and AR environments are used for the development of the engines. The mechanics and technicians work with VR and AR lenses that they can put in their eyes and are therefore always part of a global network. If necessary, colleagues from other regions can quickly be called in to solve a very specific problem on an engine. To make this possible, the company had to invest heavily in the collaborative skills of its employees. The tool competence, the cooperation with machines, but also the intercultural competences had to be developed substantially. The intercultural competences could be improved in two ways. The real-time translation of languages and dialects into a target language has led to a significant increase in intercultural understanding. At last it was possible to understand even fine cultural nuances. The cooperation with the machines was also improved via language assistants. The intelligent machine was no longer seen as a competitor but as a partner. Handling the VR and AR lenses took a little longer. At the beginning there were still deficiencies in usability. The lenses hurt after a 6-hour working day and the eye also had to get used to handling information on different levels. In the meantime, however, this has become established and the lenses are now also used privately by many employees, for example when it comes to operating kitchen machines intelligently at home.

Collaboration Technologies

- AI Collaboration: Collaboration is organized through intelligent platforms that bring together people with similar issues. The collaboration is analyzed and evaluated and the results are continuously used to improve the algorithms.
- Window-to-Screen: Every window becomes a screen. This makes it possible to make better use of the window surfaces of buildings. Large screens and projectors become superfluous.
- Proximity tracing: The technology used to combat the pandemic has been further developed. Proximity tracing is used to record patterns of behavior, interests, skills, projects and much more. This makes it even easier to bring the right people together to solve current problems.

Example
The company NextScreen (fictitious example) develops technologies that enable smooth surfaces such as windows, mirrors or building facades to be used as a medium for screen content. In this way, it is possible to display content from small devices on large surfaces. As a result, classic screens were no longer needed. On the road, small screens are used and, if necessary, applied to large surfaces when several people need to work together. The technology is called "window-to-screen" and has revolutionized collaboration. But NextScreen has other fields of activity. The collaboration, which now takes place over large surfaces, is continuously analyzed by AI algorithms. AI collaboration makes it possible to support teams that are no longer able to get on with their collaboration. Situational help, recommendations or proposals for solutions can now be played onto the large surfaces, which helps a team to discover the right solutions and next steps itself. Proximity tracing can also be used to bring together people with similar ideas or problems. Each person working on a large surface is linked to the topics and solutions worked on there and can thus appear on the screen of other teams when special expertise is required.

3.2 On the way towards 2030

The world was a different place after the Corona crisis. Nadire was in her early twenties and can well remember how numerous initiatives, BCP (Business Continuity Planning), concepts, and many new projects emerged from the corona crisis. The Swiss government formed its own department for digitization. Organizations such as ‘digitalswitzerland’ (www.digitalswitzerland.com), Mindfire (www.mindfire.global), Swiss Cognitive (www.swisscognitive.ch) and numerous start-up incubators (e.g. EdTech Collider www.edtech-collider.ch and VentureKick www.venturekick.ch) became members. The State Secretariat for Economic Affairs SECO formed a task force to finally regulate the topic of home offices in terms of labor law. Together with the employers' associations and the trade unions, models were drawn up to regulate commuting, home office, weekend work and work at off-peak hours when employees themselves regulated their work in terms of time and place.

2021 After Corona
What was started in 2020 was implemented in 2021; there was a real boost in initiatives. In order to process the Corona crisis and draw conclusions from it, a series of hackathons were held. Gartner had to readjust its HypeCycle and was able to shift some trends and technologies towards the "Slope of Enlightment". Many companies have questioned their entire work organization. Home Office became the standard, Bring your own device became part of the normal IT infrastructure.
But there were also critical voices. It was obvious that there were still major shortcomings with regard to "digital literacy". New competency models were developed based on studies by (Ashoka 2018), (IFTF 2011) and the (Stifterverband 2018). The Swiss Informatics Society founded a new specialist group "Digital Literacy". The meetup scene picked up momentum again and discussed the experience of the Corona crisis in numerous presence meetings. Ideas for new collaboration technologies and digital business models of start-ups were taken up in the coworking spaces. Technology providers such as Zoom and Microsoft teams were able to establish themselves in the working world across the board.

2022 Achievements
One year after the Corona crisis, the initiatives entered the productive phase. "Teams" had become the standard for collaboration. But there were also new niche players who were able to benefit from the Corona crisis. CollaBoard was able to place its creative board, which connects the digital with the analog world, in many companies. Adobe Connect returned with a completely new version and once again took the lead in web conferencing solutions. At universities and technical colleges, there were new training courses on the subject of "collaboration". These not only covered technological topics, but also social, psychological and cultural ones. It was understood that digital collaboration is a new cultural technique that is already part of the curriculum in primary schools. In the teacher training colleges, prospective teachers were trained to create didactically meaningful digital lessons.

2023 Backslash
The valley of disillusion had to be crossed in 2023. There was criticism of home office models, students wanted to participate more in classroom courses again and self-organized organizational models were partly replaced by top-down structures. After the visionaries and masterminds, the sceptics and traditionalists again led the discourse. And they were partly right. There were still gaps in the social security models for freelancers and micro-companies. Employees in the home office worked 7 days a week, although sometimes only 3-5 hours a day, which led to difficulties with the accounting of working hours. Productivity in online meetings had partly decreased again, as no time was invested in proper planning and moderation. It became apparent that thousands of years of working and learning in co-presence could not be replaced by a few years of online presence. This insight led to a more detailed analysis of methods, processes and, above all, technologies for digital collaboration. There were numerous new Collaborative UX companies that dealt with details of the user experience (Steimle | Gelding 2018). The moderation of online meetings was supported by intelligent assistants, which warned the moderator when a break was appropriate or made suggestions for interaction and group exercises. Chat bots reported independently in online meetings and thus stimulated the discussions.

2024 Olympia
The 2024 Olympic year gave a new impetus, and after the 2020 Olympic Games had to be cancelled, everyone looked forward to a new start. There were some technical innovations. For example, the drones of Volocopter (www.volocopter.com) and Airbus circled over Paris and the spectators could participate live and directly in the games via VR glasses and in VR arenas. Microsoft distributed millions of Hololenses for this purpose; Logitech came out with a new camera for holograms and thus made it possible to bring the athletes directly into their own homes. On a voluntary basis, the athletes were able to use chip implants that continuously monitored their body values and shared them with fans around the world. Numerous implant start-ups worked to turn the vision of "Johnny Mnemonic" from the 1980s (https://en.wikipedia.org/wiki/Johnny_Mnemonic, Gibson 1981) into reality and make it available to companies. Many employees experimented with the new technology and used it to improve their teamwork. In every meeting and workshop, the body values of all participants were displayed on large displays for all to see. Together they analyzed, discussed and reflected on the changes in body values in different phases of the collaboration (an extension of Gasparyan 2020).

2025 World of 5G

By the end of 2025, nationwide coverage with the 5G mobile communications standard could be completed. This made it possible to address practically every object via its own IP address and to advance networking between objects. Cooperation with IP-integrated objects in combination with speech recognition and digital assistants increased the opportunities for freelancers and small companies in particular. Collaboration and learning with machines (Stoller-Schai 2020b, Wilson | Daugherty 2020) took on a new significance and led to the implementation of a "Knowledge Navigator" as Apple had already presented it in a short film in 1987 (see: https://www.youtube.com/watch?v=9bjve67p33E).

2026 Literacy
This year, the UNO held another world congress on the topic of "Digital Literacy". It was found that digital literacy in countries with good education systems has been significantly improved on average. However, there were significant differences within and between countries. A new digital divide manifested itself between those with access to technology, education and the Internet and those who were denied such access. Large corporations such as Microsoft, Alphabet, Tencent, Apple and Alibaba formed a consortium that took on the task of closing this digital divide and providing Internet access, hardware, software and, above all, education.

2027 Displays
The introduction of wall-sized displays led to a new intuitive form of collaboration. Window surfaces could be transformed into large-format screens with the new technology, so that all objects of a collaborative process could be viewed. These visualization options greatly simplified digital collaboration. "Collaboration on any Window" became a buzzword and turned even the smallest apartment into a collaborative space. Pinboards, flipcharts and even tablets became increasingly less important.

2028 Holograms
A further step followed a year later. Hologram technology finally made it possible not only to make people visible on a screen or a window, but also to place them in a three-dimensional space where they could interact with one another. This significant improvement in the immersive experience made working with people in other places even easier and more intuitive. This also had an effect on mobility behavior. It became less necessary to travel to another place to meet with others. Thanks to hologram technology, all participants are able to gather in one place and do so in a very real way. This gradually had an effect on traffic, as commuting to work slowly became less important.

2029 Language
Natural Language Processing and Automatic Speech Recognition have been so successful in recent years that it has become possible to translate not only the main languages but also any dialect from an input language into a target language. In the process, intercultural background information was always included, which led to a drastic improvement in cooperation in internationally distributed projects. Finally, one understood one's counterpart and was able to deal with subtle cultural aspects, develop more empathy and understanding for each other, thus improving productivity and the success rate in projects.

2030 Nadires Work
The 10 years between 2020 and 2030 brought about similar changes as the first 10 years after Steve Jobs' keynote speech on the launch of the first iPhone on 9 January 2007 (see Steve Jobs' Keynote https://www.youtube.com/watch?v=x7qPAY9JqE4). Nadire's way of working has become the norm. Nadire works alone, but always together with others and in constantly changing constellations. Digital collaboration and the connection of companies with a temporary team of freelancers and specialists has proven its worth after the employment law foundations were created. Nadire looks confidently into the future. The technological development of the last 10 years has not aggravated global problems, but has partially reduced them through new forms of local and digital collaboration. The physical need for mobility has been replaced by a digital one. But Nadire is also aware that there is still a lot to do. Even in Zurich, the opportunities and resources are fairly distributed and Nadire has decided to pass on her knowledge of digital collaboration to others in the form of free courses and coaching. She will participate in a global hackathon next year which will be about "Future Collaboration.

4 Recommendations to implement collaboration landscapes

To implement the above described Collaboration Landscape 2030 the following recommendations should be taken into account:

1. We must develop our own collaboration strategies in companies, schools, universities and institutions: A collaboration strategy defines:

- which stakeholders collaborate with each other through which channels.
- which competitive advantage is to be achieved through better collaboration.
- which collaborative forms are implemented
- which competencies are required for which roles.
- which technologies and systems are required and made available.

2. We need to build, promote and maintain collaborative cultures:

- Collaboration within a company aims to dismantle silo structures and work together across departmental boundaries.
- Collaboration requires intercultural skills in dealing with stakeholders from other cultures.
- Collaboration builds on a culture of trust. All stakeholders are given a leap of faith - those who abuse it lose trust and thus the basis for collaboration.
- A culture of collaboration requires a collaborative attitude and attitude of leaders.
- A collaborative culture requires leaders who can lead virtually.
- A collaborative culture is based on everyone taking on leadership tasks when necessary. There are no more rigid pyramid hierarchies.

3. We need to better understand collaboration processes in the digital and analog domain and develop a real collaboration grammar (Terkessidis 2018) so that we can speak the collaboration language:

- A collaboration grammar defines all elements needed to describe collaborative processes: People, places, actions, outcomes, processes.
- A typical collaborative process goes through 5 stages (Stoller-Schai 2003/2019):
  1. team building (forming)
  2. determine common language (grounding)
  3. designing the procedure
  4. simultaneous cooperation (performing)
  5. reaching conclusions (concluding)
     - Recording results (results)
     - Summative reflection
- How we talk about collaboration needs to be more differentiated: The phrase "I'm working with you" can have many different meanings and describe a wide variety of activities. For a collaborative grammar such a sentence must be better describable, so that one can build on it and build the right collaborative structures and processes.

4. We must keep an eye on equal opportunities and ensure access to technology, networks and training for all:

- Access to collaborative technologies and the right networks determines how successful someone is. Collaborative technologies and access to networks must be guaranteed for all in order to create equal opportunities.
- Successful collaboration is based on the heterogeneity of the people involved. The more heterogeneous the group of people involved, the more creative the result can be, provided the five process steps are successfully completed.
- Collaborative competence is a key qualification for the competitiveness of individuals and companies. Collaborative competence must be trained and educated, both in a digital and an analogue context.

5. We must experiment with new forms of collaboration, both digital and analogue. Only if we gain experience ourselves, we can develop new forms of collaboration.

- Collaboration lives from self-application and self-reflection. The more you collaborate with others in different forms and channels, the more you see possibilities for new forms, the need for new technologies and new solutions.
- Only those who collaborate with others themselves can speak confidently about collaboration. Managers must be collaboration professionals and support and accompany others in this process.
- How we will collaborate effectively in 10 years we do not know yet. But we do know that the new forms of the future will grow out of the lived forms of the present.

5 References

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