HOW COVID-19 PROMOTES ORGANIZATIONAL AGILITY - A PUNCTUATED SOCIO-TECHNICAL CHANGE PERSPECTIVE

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Research Paper

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Abstract

The ability to sense and respond in a rapidly, unpredictably, and continuously changing digital environment requires a high degree of organizational agility and consequently requests a fundamental change in the organizational socio-technical system. Especially when socio-technical systems are punctuated by critical incidents like the COVID-19 pandemic. We apply a process ontology on transformational changes of socio-technical systems in response to the COVID-19 pandemic, following 13 organizational paths through in-depth interviews with top-tier managers. Our theory describes the transformation process enacted by COVID-19 as four-phased process. We illustrate that this transformation process changed the composition of the socio-technical system elements through the critical incident of the COVID-19 pandemic. In so doing, our process theory contributes to a better understanding of the embodied change in the individual components of the STS through critical incidents. In addition, we provide useful practical insights on what decisions and activities during the process elicited favourable changes towards organizational agility.

Keywords: Organizational Agility, Process Theory, Punctuated Socio-Technical System, STS, COVID-19, Organizational Change

1 Introduction

“There are decades where nothing happens; and there are weeks where decades happen” - Vladimir Ilyich Lenin

The ability to sense and respond in a rapidly, unpredictably, and continuously changing digital environment requires a high degree of organizational agility (Overby et al. 2006; Sambamurthy et al. 2003; Tallon et al. 2019). In order to achieve this goal, many companies across all industries have recently launched various “agile transformation” initiatives (Chan et al. 2019; Lu and Ramamurthy 2011; Ravichandran 2018; Tallon et al. 2019). These transformation efforts, usually aiming at increasing flexibility, customer focus, and speed on different organizational levels, represent a fundamental socio-technical change within organizations (Baxter and Sommerville 2011).

Existing organizational agility research primarily focuses on performance implications (Mavengere 2013; Overby et al. 2006), on the enabling and facilitating role of IT (Tallon et al. 2018), as well as on its organizational implementation (Rigby et al. 2018). Against this backdrop, socio-technical systems (STS) theory may allow for a better and more nuanced understanding of these transformation initiatives. STS theory describes the interrelationship of social and technical parts of an organization or work unit in respect to produce a certain work output (Trist 1981). A STS perspective provides rich insights into the fundamental organizational building blocks to be changed as well as their reciprocal relationships to
successfully master the overarching transformation process (Alnuaimi et al. 2010; Gopal and Koka 2012; Sarker et al. 2019; Venkatesh et al. 2011). For instance, existing research has made great strides in investigating computer assisted work (e.g. Mumford and Weir 1979), methodologies for designing IS, and the understanding of IS failure (e.g. Bostrom and Heinen 1977a; Bostrom and Heinen 1977b). Being a theory of organizational work design (Parker et al. 2017), STS theory allows for unraveling how these changes affect working practices within organizations and how these changing work processes are actually implemented on a more fine-grained level. However, STS theory is an inherently static perspective that is not well suited to describe an organizational transformation itself (Avgerou and McGrath 2007). As a consequence, Lyytinen and Newman (2008) have proposed punctuated STS model that describes how external shocks and critical incidents—such as the COVID-19 pandemic—trigger changes in STS in organizations. However, the punctuated STS model is of conceptual nature only as it is based on the assumption of organizational stability, lacks empirical validation, and predominantly focuses on the triggers of change (McLeod and Doolin 2012).

Extending this line of argumentation, the COVID-19 pandemic had far-reaching consequences that did not only affect organizations in their pursuit of agility, but also in their entire STS. For example, as most companies worldwide, the ABB Group, a Swiss-Swedish industrial manufacturing company, had send 90,000 employees to the home office and to form decentralized, autonomous working groups from one day to another. COVID-19 has put existing STS under extreme pressure and—even if some of the changes were partly revoked after infection curves have flattened—it is likely to irreversibly change how organizations set up their working processes in order to strengthen their agility, or more precisely, their ability to respond to such external critical events. In this paper, we thus research how organizations have responded to the COVID-19 pandemic and how they leverage their undertaken emergency response measures in order to increase their organizational agility of their STS in the long-run.

In order to address this research goal, we focus on the organizational (re-)adjustment process of existing STS during the COVID-19 pandemic (Lyytinen and Newman 2008). Based on qualitative interviews with CIOs (Chief Information Officer) of 13 companies from various industries, we propose a process theory which explains how organizations restructure their working processes for increasing organizational agility along the phases of decentralized work organization, digital capabilities, process rethinking, and agilization. Our findings show how critical incidents such as the COVID-19 pandemic may initiate change in organizations to increase organization agility as well as how this change is embodied in the individual components of the STS during the process.

This paper is structured as follows: In section 2, we present organizational agility and (punctuated) STS theory and synthesize them to a guiding theoretical framework that is guiding that research. In section 3, we outline our methodology that is followed by the presentation of our results in section 4. Finally, theoretical and practical implications are discussed in section 5. Limitations and areas for future research are presented in section 6.

2 Theoretical Background

In this section, we present the concept of organizational agility, punctuated socio-technical system theory, and combine them into a guiding theoretical framework underlying this research.

2.1 Organizational Agility

The purpose of organizational agility is the efficient exploitation of unexpected changes (Cai et al. 2019; Goncalves et al. 2019; van Oosterhout et al. 2006) in the environment to protect and leverage organizational performance (Brinkhues et al. 2019; Felipe et al. 2016; Holmqvist and Pessi 2006; Shanks et al. 2018).

However, organizational agility is highly important in a dynamic and volatile environments in which external and internal changes happen rapidly, unpredictably, and continuously (Felipe et al. 2016;
Hassna and Lowry 2016; Lu and Ramamurthy 2011; Tallon and Pinsonneault 2011; van Oosterhout et al. 2006). Such an unstable environment can be conceptualized as a two-dimensional construct containing the speed, and the unpredictability of changes (Park et al. 2017). The speed of changes describes the rate at which new events and opportunities emerge (Davis et al. 2009; Eisenhardt 1989). Thus, the higher the speed of changes, the higher the rate at which new events and opportunities emerge. In order to use these emerging opportunities organizations need to create structures to anticipate and uncover information (Nazir and Pinsonneault 2012; Park et al. 2017) in the environment before rivals do (Hoonsopon and Puriwat 2019; Lee et al. 2015; Lo and Leidner 2018; Sambamurthy et al. 2003). In regard to this, speed is of absolute essence as critical events such as the COVID-19 pandemic occur rapidly with a high business impact.

Organizational agility enables organizations to execute fast competitive action, which follows the uncovered opportunities and threats (Fink and Neumann 2007; Tallon et al. 2019). Thereby the action of assembling (Sambamurthy et al. 2003), adapting (Yang and Liu 2012), reconfiguring (Felipe et al. 2016; Hazen et al. 2017; Reitz et al. 2018) as well as the coordinating (Ravichandran 2018) of the organizational resources in that way that a rapid change manifests itself in competitive action. Which is as a core pillar of strategic thinking as they challenge the status quo and are critical for organizational performance (Mikalef and Pateli 2017; Overby et al. 2006; Park et al. 2017; Sambamurthy et al. 2003). However, organizational agility unfolds its power within a better rate of “speed in action” in which an organization acts with faster and better competitive actions upon a critical event relative to its competitors (Fink and Neumann 2007; Nazir and Pinsonneault 2012; Sambamurthy et al. 2003; Tallon and Pinsonneault 2011). Examples to a better responding power can be seen during the COVID-19 pandemic, where organizations such as Wal-Mart swiftly offered their customers new way of product delivery during the lockdown such as curbside pick-up.

### 2.2 Punctuated STS Change

According to STS theory, every organization or work system consists of a social system (i.e., people and structure) and a technical system (i.e., technology and tasks) to produce a good or service for customers (Bostrom and Heinen 1977b; Lyytinen and Newman 2008). STS theory helps to analyze and understand the organization of work and underlying work systems, and enables to capture the associated transition in the transformation process from one system state to another (Alnuaimi et al. 2010; Gopal and Koka 2012; Sarker et al. 2019; Venkatesh et al. 2011).

The theory of punctuated socio-technical system change assumes that long periods of small, incremental changes are interrupted by short periods of discontinuous, radical changes (Abernathy and Utterback 1978; Romanelli and Tushman 1994; Tushman and Anderson 1986). The central argument of punctuated socio-technical change is that change oscillates between long periods of stability and short eruptions of radical change (Gersick 1991). Although incremental change is assumed, radical change is the focus of interest in the model of punctuated socio-technical change (Lyytinen and Newman 2008). Traditionally, socio-technical theory assumes organizational stability in that the system remains in a state of equilibrium. If one component of the STS is varied in such a way that a structural imbalance in the system is created (no existing equilibrium), for instance through changes in the technology dimension, the system need to compensate the resulting gap through the other components (e.g., People, Task, Structure) within the STS to refind its equilibrium (rebalancing) (Lyytinen and Newman 2008).

In the event that a structural misalignment reduces the organizational performance, two types of reactions can occur (Lyytinen and Newman 2008). First, the other components adapt incrementally, as the depth structure of the system allows. In the original formulation of Leavitt et al. (1964), this followed exclusively a linear interpretation in which a socio-technical system generally adapts only incrementally (Mumford 2006). Second, the system restructures itself and establishes a new depth structure. Weick (1998) sees in the linear and incremental interpretation of Leavitt et al. (1964) the difficulty when systems shift in a direction of increasing disorder and reach an edge where they have to rewrite their composition rules, which can only be resolved by non-linear punctuation. Such non-linear punctuation are critical incidents such as the financial crisis, technology advancements or health crisis. Thus, during
such critical events and the punctuation of the socio-technical system, the system elements are reconfigured in such a way that it exhibit new, emergent characteristics. This non-linear and non-deterministic behavior of the system, which can set the system in a circular motion which produces the necessary system change. Or to put it in other words: a system change that would never have taken place without a specific event.

2.3 Reaching Organizational Agility through (re)adjustment of the STS

In recent years, companies have invested in initiatives to increase organizational agility. As the perspective of organizational agility is a general organizational view, the transition is nevertheless characterized by rather small, often disjunctive operational changes in the work system. From the strategic component, operational changes can often be derived directly. The project of organizational agility therefore involves on different levels an STS change which is approached in organizations in many different ways, e.g. the introduction of Scrum, Kanban, internal crowdsourcing or artificial intelligence solutions. The major obstacle that organizations had to face was the specific and pilot-like implementation of agile initiatives in individual teams and departments to be scale and connect it across the entire organization. The strategic, functional and operational changes needed to achieve the level of organizational agility that organizational initiatives are aiming for have often not been achieved effectively in the recent years (Overby et al. 2006; Rigby et al. 2018).

The introduction of these agile initiatives, which are often incompatible with the organizational structure, would demand, however, a sufficient radical change in the organizational structure and people to bring it to effective use. The incremental change of the socio-technical systems (Leavitt et al. 1964; Lyytinen and Newman 2008) could however not trigger an organizational change to achieve the given goals. Leading to an inefficient systems state where the other components do not adjust and the change does not have any effect on the system. The incremental change of the STSs could therefore not trigger an organizational change to achieve the given goals. The COVID-19 pandemic as a critical event has punctuated the STS system change to redefine the deep structure in organizations and to initiate a change that would not be possible without this event on various levels at the same time. These changes are, however, absolutely necessary to successfully promote organizational agility and achieve a new equilibrium (see Figure 1) of the socio-technical system of an organization (Lyytinen and Newman 2008; Weick 1989).

![Figure 1: Punctuated STS adapted and modified from Lyytinen and Newman (2008)](image-url)
3 Methodology

Since disruptive events such as the COVID-19 pandemic are a novel phenomenon and generally little is known about how new organizational structures manifests itself in organizations and influences the social-technical work system over time, we have chosen an inductive, qualitative research design (Creswell and Poth 2016). This has allowed us to gain rich, field-based insights into key person interactions and the resulting transformation processes (Creswell 2014; Seidman 2006). Qualitative research has a long lasting history and has been used in a number of transformation studies (e.g. Kaplan and Orlikowski 2013; Mirabeau and Maguire 2014) and are considered suitable analyze contemporary series of events over which researchers have little or no control and to generate multiple observations on complex transformational processes (Eisenhardt and Graebner 2007; Langley 1999).

3.1 Research Setting and Sampling

In selecting suitable interview partner, we followed (Creswell and Poth 2016) by selecting organizations with a comparable starting point and from as diverse business contexts as possible. We were able to recruit a total of 13 large, publicly listed corporations from Germany, Austria, and Switzerland. All organizations have started large-scale work transformation programmes in the last years. As one part in these large transformation programmes, all organizations wanted to take actions towards a more agile work organization. Furthermore, for lateral replication all companies are very well suited for this purpose, since the implementation approach was motivated by different reasons and showed substantial differences across the organizations (Creswell and Poth 2016).

3.2 Data Collection

Two main sources of data were used: First, we conducted retrospective interviews with 13 chief information officers (CIOs) (with five organizations we conducted follow-up interviews), and second, we collected pertinent documents. We conducted in total 18 semi-structured interviews (see Table 1). Interviews lasted between 45 and 90 minutes and were conducted as phone or video call. The interviews were transcribed, coded, and analyzed by using the analysis software Nvivo 12. In addition, documents were consulted in order to triangulate interview data including meeting protocols, taskforce transcripts, video-call recordings, intranet posts, and comments. For the initial phase of developing the interview protocol, we followed Kvale (1996) and designed an open-ended interview guideline in order to ensure that our semi-structured interview approach allows for tracking the transformation towards increased organizational agility enacted by the COVID-19 pandemic until the specific time of the interview as accurately as possible (Myers and Newman 2007). In order to understand the longitudinal process of reorganisation, we conducted an initial pilot analysis following the first wave of five interviews to identify the key decisions, activities and events in the development of reorganisation in all companies. This initial analysis led to some adjustments to the interview guiding questions (e.g. who was responsible and on whom did this impact). These results were taken up and refined with the interviewee from the first round of interviews and determined the focus of data collection for the following interviews - a fairly normal process in inductive research (Eisenhardt and Graebner 2007).

<table>
<thead>
<tr>
<th>Firm</th>
<th>Industry</th>
<th>Revenue in Million EUR</th>
<th>Number of Employees</th>
<th>Informants Interviewed by Type</th>
<th>Number of Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>Electrical Equipment</td>
<td>30’000 EUR</td>
<td>&gt;140’000</td>
<td>CIO</td>
<td>2</td>
</tr>
<tr>
<td>Beta</td>
<td>Financial Services</td>
<td>100’000 EUR</td>
<td>&gt;120’000</td>
<td>CIO</td>
<td>1</td>
</tr>
<tr>
<td>Delta</td>
<td>Mechanical Engineering</td>
<td>1’000 EUR</td>
<td>&lt;3’000</td>
<td>CIO</td>
<td>2</td>
</tr>
<tr>
<td>Eta</td>
<td>Financial Services</td>
<td>30’000 EUR</td>
<td>&gt;40’000</td>
<td>CIO</td>
<td>1</td>
</tr>
<tr>
<td>Gamma</td>
<td>Real Estate</td>
<td>500 EUR</td>
<td>&gt;3’500</td>
<td>CIO</td>
<td>2</td>
</tr>
</tbody>
</table>
Iota • Manufacturing 3’000 EUR >10’000 CIO 2
Kappa • Financial Services 6’000 EUR >3’000 CIO 1
Omega • Retail 28’000 EUR 100’000 CIO 1
Rho • Financial Services 3’000 EUR >1’000 CIO 1
Sigma • Financial Services 2’000 EUR >3’000 CIO 2
Tau • Financial Services 3’000 EUR >9’000 CIO 1
Theta • Telecommunication 1’500 EUR >20’000 CIO 1
Zeta • Manufacturing 36’000 EUR >140’000 CIO 1

Table 1: Number of Interviews

The interviews were carried out over several months (April 2020 – September 2020), since the respective interview partners were strongly involved in the managerial decisions during the COVID-19 pandemic. This approach had led to two advantages: First, we could retrospectively inquire the interview partner about activities, decisions, and events at different points in time. Second, the possibility to gather real-time data helped us mitigate retrospective bias (Miller et al. 1997). Thus, we were iteratively able to refine, link, and validate the information obtained in earlier interviews and to follow the unfolding processes in response to the COVID-19 pandemic more precisely. Once all the data was collected, a detailed descriptive chronology of the organizations was prepared and submitted to the interviewees for verification.

3.3 Data Analysis

To systematically extract the transformation process enacted by the COVID-19 pandemic and to analyze how the organization of work changed the composition of the organizations’ STS, we coded the interviews. Codes “are labels that assign symbolic meaning to the descriptive or inferential information compiled during a study” (Miles et al. 2014, p. 71). They can be used to retrieve and categorize chunks of information in interview transcripts to cluster segments that relate to a particular construct or theme (Miles et al. 2014). In our research, the codes serve to structure the verbalizations of the transformation processes work organization is undergoing from the interviews. We use these codes to derive distinct transition points from one phase to another, analyze the different arrangements of work organization within the phases, and how the organizations dynamically change. In doing so, we followed a data analysis and coding approach proposed by Gioia et al. (2013), which is well established in related literature on work organization and process research (e.g. Vuori and Huy (2016), Schilpzand et al. (2015) and Strike and Rerup (2016)).
HOW COVID-19 PROMOTES ORGANIZATIONAL AGILITY

We conducted the analysis in two waves. First, we inductively analyzed the data to derive different events, decisions and activities, which occurred during the COVID-19 pandemic in an explorative fashion. We applied a multi-staged coding scheme with first-order codes, second-order concepts, and aggregated dimensions (see Figure 2). First-order codes represent informant-centric terms that emerge during the interviews. For these codes, we adhered to words that were used by the interviewees to describe the decisions, activities, and events leading the transformation of work. Based on similarities and differences in these codes, we derived second-order concepts that represent germane themes and categories described during the interviews (Gioia et al. 2013). Finally, it is possible to aggregate these second-order concepts to aggregated dimensions (see Figure 2). In order to derive the time-related process phases from the data, we followed the temporal bracketing strategy proposed by Langley (1999). It represents a common approach for analyzing process data and is especially well-suited for an “open-ended inductive approach that most researchers use in process research” (Langley et al. 2013, p. 693). At its core, temporal bracketing refers to the decomposition of data and the explicit investigation of successive, adjacent periods and contextual changes in order to obtain a temporal classification of how actions in one period lead to changes in context that affect actions in subsequent periods (Langley 1999). Based on these codes (aggregated phases), we reconstructed the transformation process enacted by the COVID-19 pandemic and its sub-phases. These processes can then be grouped based on the number of transitions between phases and similarities in their alignment to describe the processes as “evolving post COVID-19 agile organization” (Langley 1999).

Second, building on the initial inductive analysis, started a phase of deductive reasoning (Hyde 2000; Miles et al. 1994). In doing so, we coded the interview again on events, decisions, activities to create a list of first-order codes, which serve as the basis to assign the codes into distinct categories of the
HOW COVID-19 PROMOTES ORGANIZATIONAL AGILITY

respective STS components (see Section 2.2 and Figure 2). In order to be able to trace the exact course of the influences on these components, we used the same temporal bracketing approach proposed by Langley (1999) to match the different STS component changes and the respective decisions, activities, and events to the corresponding transformational phases.

To increase confidence into the analysis, two researchers were involved in the coding process. We followed Saldana (2015, p. 27), who notes that coding “can and should be a collaborative effort” to develop more objective perspective on the codes and their interpretation. For this purpose, literature suggests an iterative process of “constant comparison” (Corbin and Strauss 1990). In line with Saldana (2015) and Harry et al. (2005), we did not attempt to develop a numerical reliability rating, but to reach a consensus on the appropriate usage of the set of codes. We developed potential concepts and dismissed, changed, or retained them based on comparisons across the interviews to achieve a coherent synthesis. We discussed preliminary results and variations and gave our raw data to independent students for analysis (c.f. Lehrig et al. 2017) We adapted the concepts whenever suitable or necessary. In this way, we embarked on “a process of testing the codes for clarity and reliability” (Harry et al. 2005, p. 6). We repeated the process until we reached consensus with regard to the aggregated phases of post COVID-19 agile organization.

4 Results

Drawing on the findings from our analysis, we first present the overarching process in response to the COVID-19 pandemic and second the changes in the STS components emerged from the critical incident of the COVID-19 pandemic in the respective phases.

4.1 Organizational Situation opposed through the COVID-19 pandemic

The examined organizations were in recent years heavily engaged in large scale agile transformation initiatives. As the Covid-19 pandemic loomed and forced companies around the world to ensure operational security it was therefore relatively easy for these companies to create the necessary technical prerequisites to implement the social distancing rules made necessary by the COVID-19 virus. However, the large scale of changes needed to take place was for these companies still a major challenge. This was especially relevant for organizations that were classified by the government as critical to the system (in the area of banking, telecommunications and mobility), as the necessary changes had to be implemented even faster and more reliably.

4.2 Process Theory towards new Organizational Structure

The presented process model (Figure 3) consists of four different phases, within these phases targeted activities and decisions are made which decisively shape this phase. Between the individual phases, corresponding triggering decisions are made which reflect the findings of the previous phase and determine the subsequent phase substantially.

![Figure 3: Overall process theory](image)

**Decentralization Phase:** At the beginning of the pandemic, all investigated companies faced the fundamental obligation of protecting the health of their employees. Therefore, a rigorous
implementation of occupational health and safety measures was carried out. However, the followed approaches were highly dependent on the different work conditions of the organizations’ industries. Beta Corporation, for example, only sent home employees who belonged to special risk groups of the COVID-19 virus. By contrast, company Zeta sent home only those employees which were highly important to the organization e.g. because of their position, knowledge etc.. The majority of the investigated companies, however, implemented a split-office solution, in which the employees used the office space in shifts. This was done to give all employees the opportunity to have an appropriate workplace, if this was not possible at home. And on the other to preserve time and provide the necessary IT capacities (VPN slots, notebooks, etc.). All in all, the measures introduced were successfully implemented in order to continue the daily work as far as possible and to protect the employees’ health. Nevertheless, this form of new wave of work decentralization had brought to light various organizational shortcomings. First, the collaboration channels in all companies were not designed to accommodate such a bandwidth of communication and had to be expanded by the introduction of new communication technologies (e.g., Microsoft Teams, Zoom, etc.). Second, the desire for social exchange among the staff was soon apparent such that the organisations started to implement additional socialization possibilities (e.g., coffee roundtables via video conferencing). Further, all interviewed managers reported that the tasks of managing has become more challenging. For instance, they reported difficulties in getting an overview of the employees' moods, challenges, or problems. This is why, for example, Teta Corporation, introduced a weekly four-eye meeting with employees and their respective supervisor in order to discuss personal and work-related issues and progress in the work results. Through the decentralized structure of work, the organizations stated in this context a change in discuss and control work. Interviewees referred to it as a change from task-based evaluation towards result-based evaluation of work.

Proposition 1: The decentralization of work leads to technology advancement and a transition from task-based work evaluation to result-based work evaluation.

Capacity Building Phase: With the successful introduction of decentralized work capabilities, all companies accepted the decentralized mode of working as being adequate to meet the same productivity standards than their regular mode of working. Some companies reported that they have even become more productive. For instance, Beta corporation experienced an increase in productivity and a reduction in software release times of several weeks for providing new applications for customers. This insight was confirmed in several other companies. We could identify three main reasons for this: First, structures were created by decentralized working that are based on results—meaning that tasks were distributed differently than in the regular office setting. Second, the decentralized work made it possible to work more focused and undisturbed than before. And finally, through fully IT-supported work, the IT infrastructure was able to develop its full potential that resulted in improved work coordination and evaluation.

Some interviewees described the compulsion to actually use the IT infrastructures for daily work as some sort of “forced digitalization of the workforce”. Consequently, all companies were able to observe an improvement in collaboration via digital collaboration channels and a noticeable improvement in the handling of IT infrastructure across all groups of employees. Several respondents cited the benefits of the pandemic as “raising potential and digital upskilling”. Further, the organizations recognized which parts IT infrastructure are no longer adequate and would be harmful for the future digitization of the organization. In this context, all respondents stated that they intend to adapt their digital strategy to renew their legacy systems. In order to enable this strategic re-alignment, the investigated companies wanted to leverage their newly build digital work capabilities and decided to reengineer organizational processes and structures accordingly.

Proposition 2: Within the capacity building phase a change of the organizational digital agenda is performed.

Reengineering Phase: In the reengineering phase, the interviewed companies contrasted the newly created work arrangements with the regular processes and structures that were in place before COVID-
19 in order to identify roadblocks that hinder digital working practices and organizational agility. In our analysis, we were able to identify two major directions. First, the improvement of internal processes to facilitate and improve the coordination and administration of work. At Gamma, for example, it was mandatory to provide written signatures of the responsible persons for important business transactions—a procedure that was quite inadequate for introducing agile work practice in decentralized fashion. Although this example, could quite be fixed quite by a digital employee identity and signature solution, it shows how relatively simple process steps can lead to extreme complications if the respective processes are not designed for an agile and decentralized mode of working. Second, organizations focused on external service delivery for customer and supplier contracts. Alpha, for example, was faced with the problem of performing maintenance on physical machines in order to prevent the customers’ plants breaking down. In order to ensure that the existing maintenance contracts were fulfilled, Alpha’s maintenance engineers were connected via video chat with local mechanics to give instructions and help with the maintenance of the respective machines. This active customer integration has enabled Alpha to complete significantly more maintenance appointments per day and increase customer confidence and satisfaction due to shorter waiting times.

This phase of reengineering had a significant impact not only on the organization’s agility, but also on how the organizations interacted with their customers. The newly created structures and the accumulated knowledge from the previous phases enabled organizations to redesign inefficient processes and inefficient processes. Overall, the made experiences have made all organizations towards a leaner process view and easier organizational structure. In this verin, two companies, Kappa and Alpha, also initiated a hackathon in order to identify and redesign business processes and thus create the freedom of decision and flexibility that are important for increasing organizational agility.

Proposition 3: Organizations perform a change from static processes to a commitment of lean process design.

Agilization Phase: The focus on streamlined processes from the reengineering phase plays a decisive role in the final agilization phase. The experiences from the previous phases have shown in all companies that employees can cope very well with a higher degree of autonomy and decision-making freedom and that this is highly conducive to increase organizational agility. For example, Omega has experienced a noticeable improvement in response times for accepting and solving IT problems at the service desk. Several managers have spoken of a kind of “forced agilization” in this context. Employees had to follow the principles of agile working partially or completely in order to successfully master their daily workloads. One manager even stated that “we now have created an agile way of working—which we have not accomplished in in a three-year transformation journey”. As a supportive factor for reaching this new level of organizational agility was mentioned the already successful implementation of agile work in the IT departments, which have served as role models and multiplicator. For example, Beta has initiated so-called “work ambassadors” who help with the successful implementation of agile work structures. However, the decentralized mode of applying the agile methodologies have led to some personalization. For example, a manager from Eta stated, that the decentralized way of performing agile erased the unnecessary steps in the methodical application. In the case of Eta, it resulted in the reduction of meetings and in more dynamic coordination processes. Due to the decentralized application of agile principles, the investigated companies experienced a structural and technological transformation of how is organized and executed.

Proposition 4: Organizations transform their work towards personalized agile principles – leading to a new level of organizational agility.

Outcome: Over the four phases, all companies observed improvements in performance, flexibility and employee satisfaction were observed leading to finally an increased level of organizational agility. In the decentralization phase, the organizations created a basis for the efficient and effective execution of work. In the capacity building phase, organizational capacities were built to leverage digital capabilities paving the way for further development in organizational agility. In the reengineering phase, organizations transitioned to leaner process organizations resulting in an increased flexibility of value
HOW COVID-19 PROMOTES ORGANIZATIONAL AGILITY

creation. The agilisation phase enables employees to perform work more autonomous and in a flexible organizational environment thereby increases the commitment and satisfaction of the employees.

4.3 Socio-Technical System Change

By examining the process of the different organizational settings through the lens of STS, we observed how the critical incident of the COVID-19 pandemic shaped the definition of STS in the respective components to increase the level of organizational agility.

**Actor:** The role of the actor has changed significantly in three traditional roles, the role of the normal team members, the role of the middle manager and the role of the CIO. First, the change from onsite work to decentralized work has required a sudden and significant change in the way employees work autonomously. This is a major change from the previous fixed structure of working hours and work plans. The more flexible autonomous work has changed the role of the middle manager and the role of a mediator and coach has come to the centre of attention. This is partly due to the increasing automatic allocation of work and partly to the self-learning of work activities. The third role that has changed significantly in our surveyed companies is that of the CIO. Here, all those surveyed emphasized the increasing involvement in corporate strategic decisions and a greater weighting of the CIO in these decisions. These changes in the dimension of the Actor created important improvements in terms of how information and decisions in the organizations are made. Leading to an increased level of flexibility and speed in this dimension, which is an important measure for organizational agility.

**Structure:** Structural changes in the STS were mainly due to the adaptation of the company structure to the technological possibilities. The decisive factor here was the redefinition and digitalization of processes and working methods. In the surveyed companies, the majority of processes were adapted or in some cases completely eliminated in order to make digital collaboration faster, easier and more flexible. The employees were given greater decision-making power and technical control mechanisms (such as plausibility check algorithms) were used. This effect had a far-reaching effect, as the execution of the work tasks was faster and smoother and in addition the employees are able to respond faster to new circumstances. The changes in the Structure component is therefore an enabler of organizational agility as it supports the execution upon sensed information in a turbulent environment.

**Technology:** In the component of technology has changed in its design. No far-reaching new technologies were introduced in the surveyed companies. However, the benefits of existing software and hardware solutions were now used at a new level. Existing collaboration tools (such as MS Teams, Skype, etc.) were used in their full range of functions, such as for the onboarding of new employees and the conducting of workshops. Also, existing platform solutions for work distribution and aggregation were used to a greater extent. Furthermore, companies have streamlined their digital processes which has led to a higher performance within the processes. The path to cloud solutions at all levels has been increasingly implemented in order to create a worldwide independent structure to guarantee access to necessary data at any time and from anywhere. This flexibility improvement in executing work and responding to new circumstances leads to a higher level of organizational agility in the use an of technology.

**Task:** The tasks within the new STS have changed from task-based task orientation to result-based oriented task management. Since the time component (e.g. working time) is difficult to trace in a decentralized setting, and since the employees are responsible for the completion of tasks independently in a more autonomous setting, the completion of work was now determined and measured by the work results. The necessary information and assistance for the accomplishment of the work tasks are obtained by the employees themselves using digital information and collaboration possibilities. However, these changes support organizational agility in two ways. First, employees are able to create faster a better shared understanding of new situations. And, secondly the autonomous working improves problem solving skills with multiple people involved making it easier for all members to experiment with new ideas and continuously improve the organizational performance.
Discussion

In this paper, we have developed a process theory which characterizes the transformation to a higher level of organizational agility enacted by the COVID-19 as four-stepped process. Across these process phases, we elaborate on the STS components, people, task, structure and technology and their corresponding dynamics through which they facilitate the overarching post COVID-19 agile organization transformation process.

Our process theory is deterministic in the sense that all organizations undergo highly comparable phases of decentralization, capacity building, reengineering, and agilisation in order to increase their organizational agility. Between these phases, the organization have been confronted with similar decisions in order to progress in the transformation process. Over the course of time and the four phases, we examined the different changes occurred in the STS dimensions.

5.1 Theoretical Implications

Our work makes two important contributions to the research fields of organizational agility and STS theory. First, research in organizational agility has made great strides in the last decade (Overby et al. 2006; Sambamurthy et al. 2003; Tallon et al. 2018). While, existing research has focused on the development of isolated mechanisms or industry domains and their potential benefits and shortcomings (Hamad and Yozgat 2017; McAvoy et al. 2013; Park et al. 2017; YoungKi et al. 2017). We complement this research by a process theory that explains how organizations transform when confronted with critical incidences such as the COVID-19 pandemic. Our research shows how digital capabilities transforms the organization of work and thus goes beyond our understanding of the organizational agility transformation (Mavengere 2013; Tallon et al. 2018). Our process theory shows critical incidents and process phases that change the perception of such novel modes of working in organizations.

Second, through our unique empirical account, we highlight the components through which transformations in organization are facilitated during extreme situations and how these components shape the overarching phases (Kouamé and Langley 2018). For instance, in the phases of decentralization and capacity building, decisions were significantly influenced by the different, sometimes rather intuitive organizational activities at the organizations (e.g. provision of social exchange over collaboration tools influenced the organizational boundaries of digital divide). In this regard, a decisive point was the decentralization as an intuitive requirement during a pandemic was recognized afterwards as a key element of organizational realignment in later phases. This applies equally to the decision on leaner processes, which subsequently led to an increased willingness to more organizational agility. With the insight what processes have a considerable influence on the individual phases and thus on the constitution and modification of the STS through the punctuation effect of COVID-19, we can show that STS are not pro-actively designed but rather arise due to constant incremental change, and the punctuation of crictical events provoking change in the STS. We thus contribute to existing STS research (Alter 2013; Baxter and Sommerville 2011; Lyytinen and Newman 2008; Trist 1981) by empirically extend the punctuated STS model by a process that describes the transition between two different STS, and thus providing a new perspective on the emergence of STS over time and extreme circumstances.

5.2 Managerial Implications

Our research results will help companies to successful manage the transformational process from traditional work organization towards a more flexible, decentralize and agile organizational work. The outlined research has the following implications for practitioners. On the one hand, our presented process study can be used in companies to better predict possible developmental steps and thus be helpful for the implementation of organizational measures.
Practitioner can use our findings as a transformation guideline in disaster scenarios to detect potential threads, opportunities and constraints along the way, and can take over the different phases and importance of corresponding work organization to ensure a successful implementation of measures to enhance organizational agility. The findings are also helpful for companies that new organizational capabilities, the better acquisition and utilization of employee knowledge and expertise can be gained through the introduction of a new organizational work structure. In addition, our cases show the high relevance of new work organization for both sustaining and creating a culture of innovation as well as the development of agile capabilities in a changing organizational environment.

6 Conclusion, Limitation and Future Research

This paper presented a organizational reorganization in an disaster szenario in form of a post COVID-19 agile organization process theory. We identified through inductive qualitative research four different phases emerged. While the decentralization phase followed the dimension of technology, business security and procedures to reassemble the social system, the following phase of capacity building fostered are shared and new explicit organizational knowledge. Which resulted in a reengineering phase bringing forward the structural and technical requirements in the to capture the benefits in the agilization phase. As a result during the process developed a new STS equilibrium with an higher organizational agility, which facilitates the advantages of flexibility, performance safety and employee satisfaction.

Although our research provides first evidence for the new organization of agile work, our results needs to be further evaluated in additional case studies and/or quantitative research. Moreover, our approach could be of limited generalizability. However, we have not tried to achieve the greatest possible generalizability, but rather to enable the transferability of our findings. Our approach is therefore characterised by a richness of detail and the greatest possible degree of precision in order to make the instantiation visible. The detailed explanations may also appear context-bound and not very transferable. However, the value of this study lies not in the specific links revealed, but in the understanding of the means and mechanisms by which they come about (Langley and Abdallah 2011; Langley et al. 2013), even though they will certainly manifest themselves differently in different situations. While the emerging process theory rather focuses on the organizational level and describes how organizations may master the transformation processes, a prospective area for future research may aim to gain a deeper understanding of the perception of this transformation process by employees. Based on our prior work, additional quantitative data from affected employees could be collected in a series of surveys to shed lights in new prospective areas.

References


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