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Long-term effects of COVID-19 on work routines and organizational culture – A case study within higher education's administration

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ABSTRACT

As a sudden, external event, the COVID-19 pandemic rapidly disrupted the workplace and required organizations to digitalize their working approaches. To understand how such external events affect organizations in the short- and long-term, we investigated the case of a higher education institution's administration, which combines features of public and private organizations. We applied a longitudinal case study and conducted interviews with 39 German higher education institution (HEI) employees at two time points during the first (2020) and second (2021) lockdown. Content analyses revealed that a general openness toward change and distinct technical infrastructure enabled efficient coping with the pandemic despite struggles with digitalization and rigidity. Advantages in work outcomes were contrasted with losses in social interactions. Flexible models (e.g., working from home or the office) were desirable long-term work concepts. We integrated our findings in a framework on factors that contribute to supporting organizational adaptations and derived practical recommendations.

1. Introduction

While organizational change is typically triggered by internal impulses and occurs in small, incremental steps, the COVID-19 pandemic disrupted the workspace radically and required organizations to change rapidly. Specifically, work routines needed to be digitalized to uphold organizations' functioning during physical distancing (Amankwah-Amoah et al., 2021). However, the impact of such sudden, unforeseen external events on organizations, both in terms of their work routines and organizational culture, is yet to be examined in detail. To deal with such changes as effectively as possible in the future, it is crucial to understand whether and how short-term adaptations, which represent direct responses to external events, transform into sustainable long-term changes (Shoss, 2021). In this context, examining both the hindering and the driving forces of change at multiple levels (i.e., organizational, team, individual) represents a promising way of developing a framework of organizational change in light of a sudden crisis. We seek to answer the following research question: How did the COVID-19 pandemic affect organizations in terms of digitalization, and what factors influence the sustainability of changes in work routines and organizational culture?

To increase the understanding of long-term changes caused by externally triggered, rapid changes (e.g., the COVID-19 pandemic), we chose to apply a longitudinal case study design within the specific context of the administration of a higher education institution (HEI). HEIs are particularly suitable for this endeavor as they combine characteristics from both the public and private sectors. Their administrative bodies can be considered public sector-like entities (de Boer et al., 2007), inheriting characteristics that, historically, have acted as inhibitors of digitalization measures (Mascio et al., 2020; Mergel et al., 2019). In contrast, HEIs' general sphere of operation is competitive (Musselin, 2018), as they compete with other institutions of higher education for student enrolment and obtaining third-party funds (Navarro & Gallardo, 2003), therefore acting similarly to privately owned (i.e., commercial) organizations (Boyne, 2002).

We conducted structured interviews with HEI employees using the critical incident technique (Flanagan, 1954) at two time points. Specifically, we collected changes in work routines that occurred in the course of the COVID-19 pandemic at the beginning of the first German lockdown in May and June 2020, and we evaluated their sustainability in light of positive/negative conditions for change during the second German lockdown in January and February 2021. Our qualitative

Abbreviations: HEI, higher education institution.

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research design was complemented with a quantitative approach for the evaluation of digital collaboration tools that gained relevance during the pandemic.

We enhance current research by proposing a systematic analysis of conditions that hinder and support rapid, externally triggered change. The resulting artifact, an explanatory framework illustrating mechanics of work routine establishment in time of sudden crisis (i.e., the COVID-19 pandemic), advances the understanding of external and internal forces at play. We explore whether barriers and resources can be utilized for understanding organizational change and the establishment or relapse of short-term changes caused by the COVID-19 pandemic in the long-term (see also [Thielsch et al., 2021](#)). For practitioners, this article advises how externally caused changes to digital work routines might be sustained in the long-term, especially in a context of rather rigid organizational structures.

2. Literature review

2.1. Organizational change during the COVID-19 pandemic

Theories on organizational change differentiate *evolutionary* and *revolutionary* change ([Jones, 2013](#); [Micelotta et al., 2017](#)). While evolutionary change describes a gradual, continuous movement in a certain direction over a longer period of time, revolutionary change is characterized as radical, drastic, complete, and/or fundamental and refers to a broadly focused turnaround of organizational processes ([Dencker, 2006](#)). Revolutionary change typically occurs when organizations are faced with drastic, unexpected changes in the environment, which requires them to act quickly and decisively to find new ways of being effective. The COVID-19 pandemic represents such a drastic and unexpected change in the environment since it rigorously restricted personal contacts to decrease infection risks.

Specifically, the COVID-19 pandemic fundamentally affected organizations and their traditional ways of working (i.e., paper-based processes), since workers needed to work from home, increasing the need for digitalizing work processes ([Almeida et al., 2020](#)). Especially using digital information and communication technologies, with their capabilities of storing, retrieving, transmitting, or receiving information, played a crucial role in coping with physical distancing at the workplace. Such technologies enabled workers to stay both socially connected and exchange work-related information and documents with digital means ([Lee et al., 2021](#)). Next to changes in work routines, the COVID-19 pandemic likely also affected organizational cultures. Cultures of presence and tradition needed to be replaced by location-independent working and openness to change. In line with organizational change literature, such changes are expected to affect all levels of an organization (i.e., organizational, team, and individual; [Jones, 2013](#)).

2.2. Sustainability of organizational change

When considering organizational change, investigating potential moderators is promising, as both hindering and facilitating factors of change might be revealed. The dualism of the hindering and facilitating elements of workplace change can especially be taken into account by investigating the sustainability of change in light of positive/negative conditions. In terms of hindering factors, fellow researchers have pointed out that change processes can be delayed and limited by structural barriers (e.g., legal, finance, time, skills) and cultural barriers (e.g., resistance to change, fear, trust) ([Chesbrough, 2010](#); [Weiner, 2009](#)). Both types of barriers negatively influence the long-term establishment and impact of (digitally) transformed objects. As the long-term establishment of change includes multiple stages, each stage has to consider different barriers that differ depending on the reason for transformation, i.e., external or internal pressure, and transformation object (e.g., artifact, process, or organization) ([Mergel et al., 2019](#); [Vial, 2021](#)).

The importance of structural barriers is highlighted by a variety of studies ([Chesbrough, 2010](#)) and features funding, technology, and skills as central features. In contrast, cultural barriers have been less researched. As the culture of an organization is hard to measure, with numerous aspects of culture being intangible ([Jreisat, 1997](#)), addressing it can become difficult. Nevertheless, the culture, i.e., practices and underlying assumptions of an organization ([Meyerson & Martin, 1987](#)), affects how people interact, make decisions, or develop strategies. Hence, its influence on organizational change is not to be underestimated.

While barriers are assumed to make dealing with the pandemic particularly difficult and prevent changes from becoming established in the long-term, facilitating elements should be especially relevant for changes to be perceived as efficient rather than only effective and for sustaining them in the long-term ([Rhoades et al., 2001](#)). For this work, we consider resources to be the psychological, physical, technological, informational, financial, and social supports, arrangements, and tools that employees perceive as being available to assist them in successfully adopting and adapting to the organizational changes that affect their work roles ([Albrecht et al., 2020](#)). Resources can create an advantage for organizations when dealing with change and form the basis upon which routines can be altered ([Eisenhardt & Martin, 2000](#)).

2.3. Higher education institutions

Higher education institutions provide a promising case of understanding the effects of unforeseen, external events on organizations as well as the barriers and resources influencing organizational change because they combine the characteristics of both public and private organizations. On the one hand, administration departments in HEIs inherit considerable structural elements from public administrations (e.g., strict hierarchies, legislation dependency; [Boyne, 2002](#); [Hofmann & Ogonek, 2018](#); [Robertson & Seneviratne, 1995](#); [Rosenbloom et al., 2017](#)). Combined with values of formality, uniformity, hierarchy, and correctness ([Meijer, 2015](#)), the result might be slow rates of change both generally and in terms of digitalization ([Makarius et al., 2020](#); [Nutt, 2000](#); [Wegrich, 2020](#); see also [Robertson & Seneviratne, 1995](#) for meta-analytic findings). Therefore, during the COVID-19 pandemic, HEIs' resemblance to administrations of public organizations might have resulted in particularly disadvantageous conditions, i.e., barriers, when forced to adopt digitalized ways of cooperating and maintaining information flows during lockdowns ([Almeida et al., 2020](#)).

On the other hand, HEI administrations need to be considered as special cases. What differentiates traditional public administrations from private organizations is that they are not driven by the need to sell goods and services to their customers in a battle with competitors ([Nutt & Backoff, 1993](#)) but offer their services unrivaled to their customers, i.e., civilians ([Denhardt & Denhardt, 2015](#)). However, this is only partly true for HEIs. Competition in HEIs has intensified across all indicators in recent years (e.g., student enrolment, funding) as well as within and across countries ([Musselin, 2018](#); [Navarro & Gallardo, 2003](#)). This and HEIs' access to innovation through research displays their similarity to private organizations, which might make them more receptive to innovative trends and, thus, considered more successful adopters of digital changes among public administrations in general ([Ogonek & Becker, 2018](#)). Therefore, HEIs' resemblance with private organizations and their closeness to innovation and research might have served as resources during the COVID-19 pandemic, helping them deal with its demands ([Boyne, 2002](#)).

3. Method

3.1. Research approach

This research adopts a qualitative, longitudinal case study methodology in combination with quantitative elements. Qualitative research is

particularly suitable for providing an in-depth understanding of a particular situation, i.e., the COVID-19 pandemic (Chowdhury et al., 2020; Mohajan, 2018). Given the novelty of the COVID-19 situation as well as the particularities of HEI administrations, we chose a case study approach in a single HEI administration as being the most appropriate to understand the short-term and long-term effects of the COVID-19 pandemic. Interviews represent the most commonly used source of data in case study-based research, since they provide an in-depth understanding of the particular case (Chowdhury et al., 2020; Merriam, 2002). We, therefore, conducted structured in-depth interviews at two time points (T1, May/June 2020; and T2, January/February 2021). Specifically, we applied the critical incident technique (Flanagan, 1954), which is a widely used method making use of experience reports of involved persons for revealing critical success and failure factors in job events (Breuer et al., 2020; Butterfield et al., 2005; FitzGerald et al., 2008). Data collection and data analysis overlapped to some extent, since we performed the first rough analyses of the interviews after each around 10 interviews. Thereby, we ensured being able to adapt our questionnaire and include further questions, if necessary. For instance, participants expressed manifold wishes for the further handling of the pandemic at T1, so we included a corresponding question after the first analyzed batch of interviews.

At T1 (i.e., in May and June 2020), participants were asked to report on efficient and inefficient work-related changes for dealing with the COVID-19 pandemic. At T2 (i.e., in January and February 2021), specific situations representing successful or unsuccessful establishments of digitalized work routines were asked to be retrieved. Open descriptions of critical situations were supplemented by quantitative scales at T2 as well as specific open questions, directly targeting our aspects of interest (i.e., barriers and resources for digitalized working, long-term establishment of changes) at both time points. The study was approved by the faculty's ethics committee as well as the university's personnel board.

3.2. Case description

The subject of study was the administration of one of today's largest German universities, founded in the 18th century. The administration is responsible for the university's 15 faculties with more than 44000 students and 7400 employees. It consists of the university management and seven departments. The administration's seven departments are as follows: Academic and Student Affairs, Central Services, Human Resources, Facility Management, Finance and Accounts, Research Affairs, and Campus Development and Construction. In addition, there are eleven other official representatives and advising offices, such as the Anti-Corruption Officer, Equal Opportunity Officer, and the Data Protection Manager. While approaches toward digitalization in teaching at the university had been made before COVID-19, the administration had a rather low level of digitalization. For instance, working from home was possible but very rarely done, as the infrastructure, i.e., VPN connections or laptops, was not universally available. This level of digitization can be ranked between the average of traditional public administrations and private organizations.

3.3. Sample

Recruiting. Since the study's research goals were of interest to the administration's management level, support was provided in realizing the study. Participant recruiting was carried out by the departments' and staff units' executives, who communicated the possibility of participating in the study to their employees. Volunteers then directly approached us, and interviews with the participants were scheduled, giving them the opportunity to participate via telephone or a videoconferencing tool. The videoconferencing tool was the chosen mode of participating for 59 % of the participants at T1 and for 72 % at T2.

Sample Characteristics. Out of 734 administration employees, 50 (7 %) approached us to participate at T1. Out of these, 46 interviews were

scheduled. Interviews with the remaining four employees were not scheduled, since the sample was already representative of the case. After conducting the interviews, two further participants had to be excluded from the sample due to technical problems during recording. Out of the final sample of $N = 44$ employees at T1, 55 % (24) were female and 45 % (20) were male. Participants were on average 45.07 years old ($SD = 9.69$, $Min = 27$, $Max = 62$) and had been employed at the university's administration for 8.73 years ($SD = 7.09$, $Min = 1$, $Max = 28$). Participants from each department, three staff units, and the central management (rectorate) were represented. Of all participants, 38.66 % occupied leadership roles. For T2, $N = 39$ out of the 46 T1 participants (85 %) agreed on a second interview. At T2, 51 % (20) of participants were female and 49 % (19) were male, they were on average 46.33 years old ($SD = 9.73$, $Min = 27$, $Max = 62$), and had been employed at the administration for 9.5 years ($SD = 7.49$, $Min = 1$, $Max = 28$). Again, all departments, three staff units, and the central management were represented, with 46.15 % of participants occupying leadership roles. Sample characteristics are summarized in Table 1.

3.4. Data collection

Semi-structured interviews were conducted between May 18 and June 28, 2020, at T1 and between January 25 and February 18, 2021, at T2. Prior to the interviews at T1, participants received information about the study's objectives and longitudinal nature and gave their informed consent. Interviews were conducted by three interviewers, one of which conducted interviews at both time points, and each other person supported the interviews at T1 and T2, respectively. All interviews were audio-recorded and transcribed using the software f4transcript. Interview procedures are illustrated in Fig. 1.

T1. After they were welcomed to the study, explained its objective, and requested to give consent for the recording of the interview, participants were asked about demographics. Participants were then requested to recall specific work-related situations from the last days in which changes in work routines occurred, whereby these changes resulted from the pandemic conditions and were perceived as particularly efficient. If not already covered, participants were then asked to recall an efficient change related to digitalization in the context of COVID-19. Then, situations representing particularly inefficient changes were requested, again followed by an inefficient digitalization-related change. For each critical incident, interviewers had a set of possible deepening questions, serving to increase the descriptions' details. Additionally, participants were asked to rate the situations' frequencies and importance as measures of their typicality. Participants had the opportunity of presenting further positive and negative critical situations. After participants were posed a set of open questions, participants were thanked and asked for their consent on using the recording of their interview and analyzing their data. Finally, participants were asked about their agreement on participating in follow-up interviews, which all participants gave. T1 interviews took about 37 min on average.

T2. Interviews at T2 were generally similar to those at T1. Participants were asked to recall specific situations within which established

Table 1
Sample Characteristics.

	<i>n</i>	Sex	Age	Employment	Leadership Roles
T1 (May/June 2020)	44	55 % female 45 % male	27 – 62 years $M = 45.07$ (9.69)	1 – 28 years $M = 8.73$ (7.09)	38.66 % with, 61.34 % without
T2 (January/February 2021)	39	51 % female 49 % male	27 – 62 years $M = 46.33$ (9.73)	1 – 28 years $M = 9.50$ (7.49)	46.15 % with, 53.85 % without

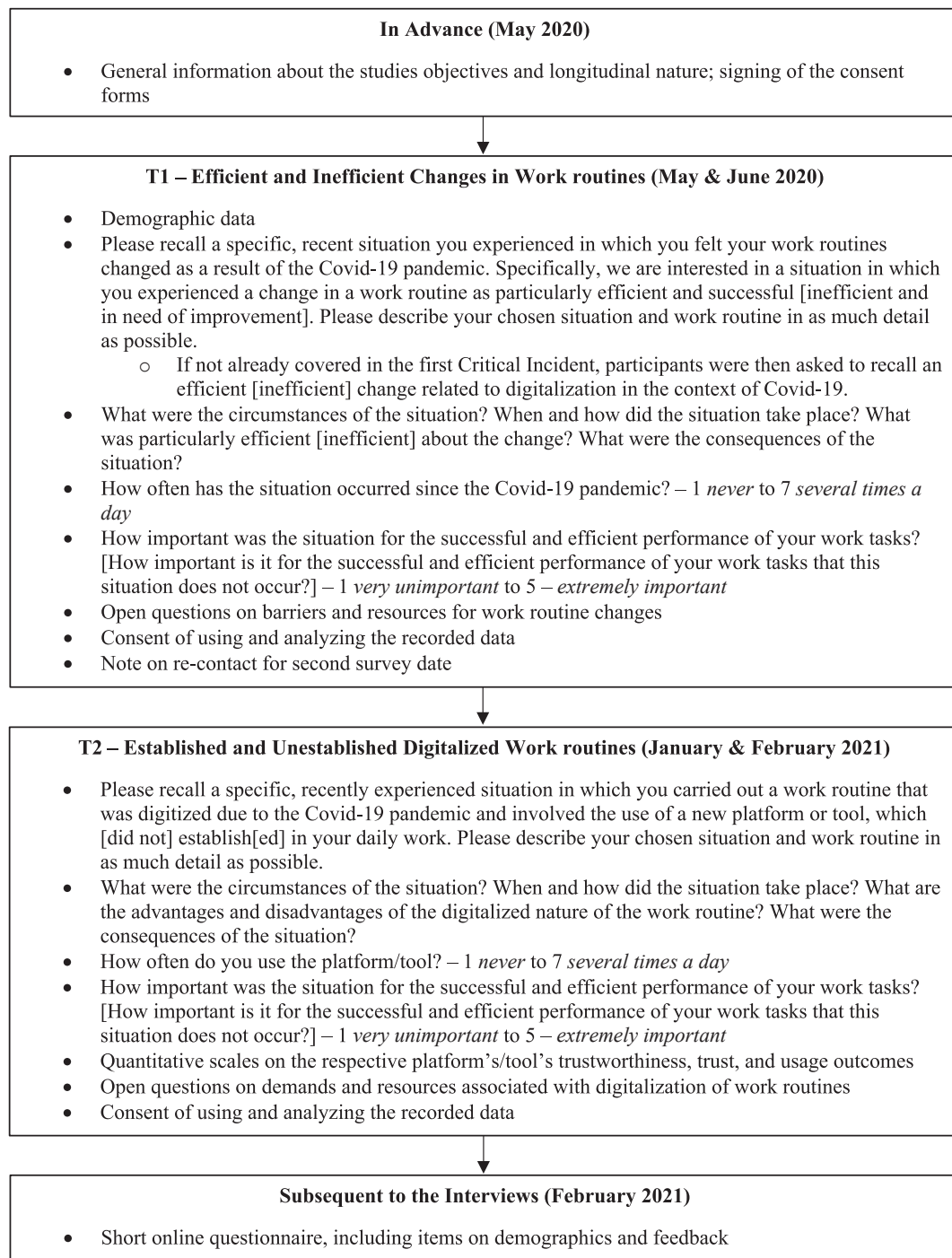


Fig. 1. Study Procedure Including T1 and T2 Interview Guidelines.

work routines were performed that were digitalized in the course of the COVID-19 pandemic and associated with the use of a collaboration tool. For negative critical incidents, participants were asked to recall situations within which work routines were performed that had been digitalized in the course of COVID-19 but could not be established to date. Again, interviewers had a set of deepening questions to increase detail in the descriptions. Additionally, a set of quantitative scales on the respective tool's trustworthiness, trust, and usage outcomes were posed (see Table 2). For both positive and negative critical incidents, participants had the possibility of reporting two additional situations. Quantitative scales were only posed for one of the critical incidents provided. After answering open questions on barriers and resources associated

with the digitalization of work routines, participants were thanked and asked for their consent on analyzing their data. The mean length of the interviews at T2 was 41 min. After the interviews, participants received a link to a short online questionnaire that included items on demographics; it was filled out by 34 participants (87 %).

3.5. Data analysis

Critical Incidents/Open Questions. Analyses of critical incidents and open questions were conducted using the analysis software f4analyse. We followed the inductive approach of qualitative content analysis for T1 and T2 (Mayring & Fenzl, 2014; see also Breuer et al., 2020; Thielsch

Table 2
Constructs Measured with Quantitative Scales.

Construct	Description	Reference
Reliability	Dependability of the tool regarding its functioning.	(McKnight et al., 2011)
Credibility	Quality of the information presented by the tool.	(Thielsch & Hirschfeld, 2019)
Usability	The tool's ease of use.	(Lewis et al., 2013)
Design	The tool's design.	(Thielsch et al., 2018)
Support	Availability of contact persons in case of problems.	(Thielsch et al., 2018)
Participation	Information about and involvement at the implementation of the tool.	(Baroudi & Orlikowski, 1988)
Involved Persons' Ability	Perceived ability of the persons responsible for the tool.	(Hertel et al., 2004)
Trust	Trust in the tool in general.	(Thielsch et al., 2018)
Performance	Associated performance increases through tool usage.	(Etezadi-Amoli & Farhoomand, 1996)
Strain	Feeling of strain while using tool.	(Stanton et al., 2001)

et al., 2021 for examples). As the first step, an initial coding scheme was developed by analyzing the first interviews. Therefore, relevant sections for answering the research questions were identified, divided into shorter sections of meaning, and named according to their contents. The coding schemes of two coders were compared, discussed, and transformed into a first coding scheme, which was used as the basis to formatively check its reliability. Within joint coding meetings during interview coding, the coding scheme was further adjusted and refined, in which higher-order categories were created. Finally, identified sections of meaning were coded again by two graduate student assistants based on the final coding scheme. Potential misunderstandings between the two raters were discussed, and interrater reliability (Cohen's Kappa) was calculated. The average interrater reliability was satisfactory for both time points (Cohen's $Kappa_{T1} = 0.73$; Cohen's $Kappa_{T2} = 0.77$).

Quantitative Scales. For quantitative scales, descriptive statistics (means, standard deviations) were calculated for the different evaluated digital (collaborative) platforms and tools.

4. Results

4.1. Levels of change

To answer the question of what changes occurred in the HEI administration due to the COVID-19 pandemic, we collected 186 critical incidents, equaling 4.23 reported incidents per participant ($SD = 0.83$). Out of these, 39 were excluded from our analyses, since participants rated the reported situations as very rarely occurring or very unimportant. The resulting 147 critical incidents (71 positive, 76 negative) were very important for the employees' jobs ($M = 4.45$, $SD = 0.77$, $Min = 3$, $Max = 5$) and occurred very frequently (positive situations: 32.6 % several times a week, 16.3 % at least once a day, 51.2 % several times a day; negative situations: 45.5 % several times a week, 12.1 % at least once a day, 42.4 % several times a day).

Based on the critical incidents, changes at three distinctive levels could be extracted that occurred within the HEI administration due to the COVID-19 pandemic (see Table 3).

Organizational Level. Changes at the organizational level affected the administration's ways of and attitudes toward working as a whole. Participants perceived a significant shift in the whole administration's openness toward change, especially in terms of digitalized working ("I think that everyone is a bit more willing, especially at the management level, to try out different things," Interview 132, par. 41–42). Old structures had to be rethought to make them adaptable for working from home, which partly also led to overthinking work routines generally. Together, these resulted in perceived increases in the administration's efficiency of working, particularly regarding time, cost, and paper savings.

Team Level. Changes in the course of the COVID-19 pandemic also affected the way teams worked together. Largely replacing personal, face-to-face communication with digitalized communication resulted in both efficient and inefficient changes in cooperation. On the one hand, digitalized communication came with time savings ("In the [...] appointment one has now devoted oneself much more quickly to things that might otherwise have taken forever to discuss," Interview 137, par. 6), efficiency increases within meetings ("you have more clearly defined what you want to talk about and I find it much more output-oriented because of that," Interview 132, par. 6), simplified collaborations on documents, stringency, structure, and transparency increases. On the other hand, however, it also resulted in a lack of personal interaction, flattened the work atmosphere, impeded information exchange, complicated leading ("Well, I'll put it this way, week after week I don't appear enough as a leader, which means I have no idea how I'm going to catch up with my staff and my colleagues in half a year," Interview 133, par. 70), and was perceived as inappropriate for certain contexts, like emotionally charged conversations.

Individual Level. Finally, changes occurred at the administration's individual employees' level, which could be grouped into emotion- and work-related changes. Regarding emotion-related changes, individual employees reported increases in well-being and the emergence of optimism and euphoria toward the occurring changes in work routines ("I think, above all the bad things Corona brings, I think there is also this chance or this possibility that new things can arise," Interview 128, par. 25), but they also perceived well-being decreases and less identification with the administration. Work-related changes included increases in flexibility and autonomy in coordinating work itself and work and private life, general efficiency increases in performing work tasks ("I would say I feel like I work [...] much more effective," Interview 117, par. 31) and a noticeable workload reduction. In contrast, employees also reported significant workload increases and efficiency decreases ("My work in the home office was brutal. So partly inefficient to brutal," Interview 138, par. 74) as well as the need to change personal routines and having a higher dependency on technology.

4.2. Digital (collaboration) platforms and tools

Changes at the three levels were caused and accompanied by the introduction or increased usage of different digital platforms and tools, which helped deal with the distinct requirements of distanced collaboration (see Table 4).

Digitalization of Communication. Since contact restrictions completely restricted face-to-face communication, platforms enabling or supporting digitalized communication were required ("Now we are [...] forced, in a way, to [communicate] via Zoom that is, via video," Interview 105, par. 25). Therefore, three collaboration platforms were reported to have been introduced to the administration's work routines, including tools for video and written communication. These were used for all kinds of meetings, like consultations, discussions, briefings, training, conferences, seminars, teaching, selection processes, as well as for work-unrelated, personal exchange.

Digitalization of Task Division and Coordination. In person, general work coordination and task division were mostly done verbally and rather informally, whereas distanced collaboration required a more structured and traceable approach ("My employees have found a way to work very efficiently with each other. In particular, they have found [...] a software [which] [...] serves to have another platform for exchanging information other than e-mail or filing in our folder system," Interview 115, par. 4). Therefore, wiki and project management tools were introduced and used for recording work processes and keeping protocols of tasks as well as coordinating projects by setting and assigning tasks, defining time limits, and keeping track of progress.

Digitalization of Documents. Since the availability of digitalized documents was reported as a central precondition of digitalizing work routines and working from home, tools were introduced to simplify

Table 3
Reported Changes due to the COVID-19 Pandemic.

Category	Description	Number of mentions
Organizational Level		
<i>Efficient Changes</i>		
Innovative, digitalized working; digitalization push	Paper-based work routines are increasingly replaced by digitalized work routines. Working is perceived as more innovative.	24 (16.3 %)
Rethinking of old structures and work routines	By familiarizing with new, successful digitized ways of working, old structures and ways of working are challenged.	17 (11.6 %)
Efficiency increases in work routines and outcomes	Work routines are perceived as more efficient in their digitalized form. Time, costs, and paper are saved.	10 (6.8 %)
Team Level		
<i>Efficient Changes</i>		
Efficiency increases within meetings	Time savings, increased structure, easier coordination, saving of ways, discussions, and feelings of safety in the home environment lead to meetings being perceived as more efficient than face-to-face meetings.	48 (32.7 %)
Improved collaboration on documents	Tool features (screen sharing) enable communicating and collaborating on documents simultaneously.	16 (10.9 %)
Stringency and structure increase	Databases need to be more structured and stringent for virtual cooperation, having advantages on work routines.	9 (6.1 %)
Transparency increases	Management of information and documents is more transparent and sustainable digitally.	7 (4.7 %)
<i>Inefficient Changes</i>		
Decline in personal interaction	Since most employees work from home, a significant lack of informal personal interaction occurred, negatively influencing trust and team building.	52 (35.4 %)
Impeding of information exchange	Getting or spreading information is more difficult, especially due to less accessibility. This ultimately results in work process extensions.	43 (29.3 %)
Flattening of work atmosphere	The working atmosphere is perceived as sterile and exhausting. Discussions proceed more slowly and are less rich. Results are more inaccurate and difficult to record.	19 (12.9 %)
Limitations in leading and being led	Leaders report difficulties in fulfilling their leadership roles due to fewer tools and less visibility. Led people perceive less activity of their leaders, resulting in uncertainties and dissatisfaction.	16 (10.9 %)
Limitations in perceiving interlocutors	Facial expressions and gestures are less well perceived digitally. Undertones and personal impressions are more difficult to convey, which makes communication less rich.	13 (8.8 %)
Communication difficulties in certain contexts	Video communication is perceived as unsuitable for large group discussions or emotional topics, therefore only a temporary solution.	12 (8.2 %)
Individual Level		
<i>Efficient changes</i>		
Emotion-related		
Well-being increases	People feel good and balanced when working from home. Work is more relaxed, tasks are perceived more consciously, as are breaks. Autonomy, personal responsibility, motivation, and creativity increases are perceived.	16 (10.9 %)
Emergence of optimism and euphoria	Changes in work routines (modernization, digitalization) are perceived positively and implemented euphorically.	5 (3.4 %)
Category	Description	Number of mentions
Work-related		
Flexibility and autonomy increase	Digitalized working enables a more flexible organization of work in terms of time, space or structure. Changes in work routines have positive effects on opportunities to coordinate work and private life.	68 (46.3 %)
Efficiency increases	People generally perceive working from home as more efficient compared to working in the office. Fewer disruptions or distractions are reported. Concentration is improved.	28 (19.0 %)
Workload reduction	New work structures have reduced the workload. More time is available for the existing work.	7 (4.8 %)
<i>Inefficient Changes</i>		
Emotion-related		
Well-being decreases	Negative states are reported that are directly related to changed work routines, but can also be caused indirectly: Stress, annoyance, dissatisfaction, exhaustion, isolation, loneliness, anxiety, and insecurity.	53 (36.1 %)
Reduced employer identification	Working from home means a lack of visibility and the special character of the usual work structures, which leads to less identification with the employer.	2 (1.4 %)
Work-related		
Workload increases	The workload has increased during the pandemic, people are also working longer hours than when in person.	22 (15.0 %)
Need to change personal routines	Familiar working methods and routines no longer suit so work routines have to be changed, which is perceived as challenging or unpleasant.	14 (9.5 %)
Efficiency decreases	Working from home is described as more inefficient. Reasons are the decreased ability to concentrate or the extra effort to coordinate family and work.	7 (4.8 %)
Technology dependency	The increased digitalization of work routines is leading to greater dependence on technology in general. A lack of technology skills can no longer be compensated for and has a greater impact.	5 (3.4 %)

Note. Number of mentions refers to statements extracted from 147 T1 critical incidents. The percentages reflect the proportion of statements that contained a respective mention. Cohen's $\kappa = 0.73$.

document filing and distribution (“[T]he whole topic of digitization in the office as well. Why do we still print paper at all and have folders with shelf cabinets? Because we have now noticed that these are things that we cannot access in the home office. And that, in turn, presupposes that we simply have a sensible documentation management system,” Interview 115, par. 52). These served as intradepartmental filing directories and cloud services for document distribution, both within and between organizations. The introduction and acceptance of digital signatures were also reported as an important element in eliminating paper-based processes.

Means and standard deviations of quantitative scales on platform and tool features can be found in Table 5. These indicate relatively high

levels of satisfaction with all kinds of platforms and tools. Trust perceptions ranged from $M = 5.17$ to $M = 6.00$ and were largely accompanied by high scores in trustworthiness measures (see credibility and support, for instance) and performance, as well as low scores in strain. However, the cloud service was perceived as especially insufficient regarding its reliability ($M = 3.33$, $SD = 3.30$), usability ($M = 3.25$, $SD = 2.47$), design ($M = 2.50$, $SD = 2.12$), and participation ($M = 2.83$, $SD = 2.59$). Notably, these results should be interpreted with caution, as they only reflect the perception of two participants. Nevertheless, open answers on the cloud service's advantages and disadvantages underlined users' dissatisfaction (“I really found it kind of confusing,” Interview 235,

Table 4
Collaboration Tools Used in the HEI Administration During the COVID-19 Pandemic.

Digitalization of	Usage Cases	Number of mentions
Communication	Consultations, discussions, meetings, briefings, training, conferences, seminars, teaching, selection processes, consulting work, instant messaging	36 (61.0 %)
Task division and coordination	Information exchange, internal knowledge management, protocols, task coordination, task planning	13 (22.1 %)
Documents	Sharing and collaborating on documents, departmental drives; digitalized signatures; digitalized event evaluation	10 (16.9 %)

Note. Number of mentions refers to the 59 answers given to the question of what collaboration tools were established in the administration’s way of working in the course of the COVID-19 pandemic. The percentages reflect the proportion of statements that contained a respective mention. Cohen’s $\kappa = 0.90$.

par. 62).

4.3. Long-term establishment of digitalized work routines and cultural changes

Interviews at T2 mainly served the aim of identifying conditions under which digitalized work routines and the use of platforms and tools would remain established in the long-term within the HEI administration. We collected 71 critical incidents (1.82 critical incidents per participant, $SD = 0.65$), two of which had to be excluded because they were rated as rarely occurring or unimportant. The remaining 69 critical situations were rated as important for the individual employees’ jobs ($M = 6.19$, $SD = 1.13$) and occurred very frequently (25.0 % several times a month, 25.0 % several times a week, 12.5 % at least once a day, 37.5 % several times a day). During the interviews, participants had difficulties remembering situations in which digitalized work routines did not remain established because the interviews took place during the lockdown, so a need to work digitally still existed. Therefore, 61 out of the 69 critical incidents were established work routines, while 8 were unestablished. However, since further questions also included whether participants could imagine work routines to remain established beyond the COVID-19 pandemic, conditions under which changes both would and would not remain established in the long-term could be identified (see Table 6).

Conditions of Long-term Establishment. Changes that had become established or were expected to remain established in the long-term were those that participants perceived to increase efficiency in work routines. Especially significant for work routines that were expected to remain established were those that provided savings in time, transportation, and paper. For instance, meetings using videoconferencing platforms were perceived as shorter than face-to-face meetings (time) (“I would like it if it continues to be used because it saves a lot of time,” Interview

217, par. 22), location independent (transportation), and paper free. Finally, other factors that promoted long-term establishment were those that were perceived as positive outcomes of digitalized working, such as increases in transparency and documentation and the simplification, standardization, and structuring of work routines through digital (collaboration tool-supported).

Conditions of Long-term Abandonment. When the digitalization of work routines was accompanied by the loss of social facets of work, returning to analog work routines was often desired (“There’s so much interpersonal stuff that misses out. What can’t be compensated [...] at all. It just doesn’t work,” Interview 222, par. 100). Participants reported on missing personal interactions with their colleagues, which decreased significantly through distanced collaboration. Also, digitalized communication was perceived as disadvantageous as compared to face-to-face communication for lacking important undertones, facial expressions, or gestures (“Well, I don’t recognize people’s body language. You kind of try to read it off the face,” Interview 220, par. 16). Beneath social aspects, digitalized working was also perceived as requiring more effort and being more exhausting than analog ways of working. This went along with the perception of a significant lack of clarity that was reported to arise from working fully digitally, especially when too many channels of communication and cooperation were being used (“I don’t know where we discussed something? Was it [...] on the phone, by email?” Interview 218, par. 29). Finally, other reasons given against working fully digitally, specifically working from home, were that the boundaries between work and private life dissolved (“I think it’s more difficult to disengage from your workplace, to really disengage, to say I’m off now,” Interview 236, par. 132).

4.4. Barriers and resources for (long-term) digitalization

Within both T1 and T2 interviews, questions on barriers and resources hindering and facilitating efficient (long-term) digitalized working were posed. We again found barriers and resources at the three distinct levels, namely the organization, the team, and the individual (see Tables 7 and 8).

Organizational Level. Barriers and resources at the organizational level referred to general conditions within the administration that affected whether changes were perceived as efficient and/or long-term.

Barriers: Participants reported a lack of preconditions for adapting work routines fully digitally within the administration. The majority of work routines were reported to still be paper based and lacking important prerequisites for their digital adaption. This impeded efficient working from home, since certain work steps still had to be performed analogously. (“If you want to work both effectively and efficiently, I have the feeling that you need to be more present, especially in our job. Perhaps at some point, when we have the digital personnel file, there will be another boost. Then you’ll be able to look things up even more from home. You can’t take your personnel file home with you,” Interview 109, par. 8). The lack of preconditions was accompanied by rigidity of the administration, which

Table 5
Means and Standard Deviations of Quantitative Scales on Collaboration Tools Used.

Tool Type	N	Reliability	Credibility	Usability	Design	Support	Participation	Ability	Trust	Performance	Strain
Videoconferencing	19	6.05 (0.98)	5.97 (1.10)	6.11 (0.66)	5.29 (1.11)	5.55 (1.07)	4.26 (1.49)	6.50 (0.65)	5.28 (1.04)	5.46 (0.97)	3.51 (1.54)
Wiki	7	6.24 (0.69)	6.00 (1.41)	5.79 (0.76)	5.14 (1.07)	5.69 (1.20)	3.90 (1.70)	6.42 (0.58)	5.43 (0.79)	5.46 (0.94)	2.14 (1.61)
Cloud	2	3.33 (3.30)	5.00 (1.41)	3.25 (2.47)	2.50 (2.12)	6.00	2.83 (2.59)	6.00	5.17 (0.71)	5.75 (0.35)	2.67 (1.89)
Project Management	2	5.50 (0.71)	6.33 (0.94)	5.75 (0.35)	3.50 (0.71)	6.00 (1.41)	5.67 (0.94)	6.50 (0.71)	5.17 (0.24)	5.63 (0.18)	1.83 (1.18)
Written Communication	1	5.67	–	6.00	5.00	5.00	4.00	5.50	6.00	6.00	1.67

Note. Scales from 1 (very low) to 7 (very high). Standard deviations in parentheses. For scales that were only answered once, there are no standard deviations.

Table 6
Conditions of Long-term Establishment vs. Abandonment of Digitalized Work Routines.

Category	Description	Number of mentions
<i>Conditions of establishment</i>		
Time, transportation & paper savings	Tool usage is associated with savings at three levels: Time (meetings are shorter, faster, appointments can be found faster); transportation (ways within the administration and to external partners are omitted); paper.	59 (85.5 %)
Facilitation of location-independent collaboration	By no longer having to be in the same place to collaborate, it is possible to work together under more conditions. For example, employees can attend meetings from further away or despite sick children; generally, larger target groups can be addressed.	14 (20.3 %)
Flexibilization of work	One's work is perceived as more flexible, especially timewise.	7 (10.1 %)
Simplification, standardization, and structuring of work routines	Work routines are simplified by eliminating parallel work steps, fewer follow-up questions, or more stringent structuring of meetings.	5 (7.2 %)
<i>Conditions of abandonment</i>		
Lack of personal contact and exchange	Digitalized communication comes with personal contacts becoming increasingly limited. This applies to contacts and communication both inside and outside meetings. Ultimately, this also leads to less of a team feeling, more potential for conflict, more difficult trust building, and less identification with the workspace.	73 (greater than 100 %)
Efforts of digital working	Digitalized working is perceived as exhausting, draining, emotionally and physically demanding, and pressuring.	36 (52.2 %)
Communication disadvantages	Digital communication has disadvantages compared to face-to-face communication since conversational discipline and creativity are more limited, conversation flows are inhibited, and the exchange of emotions is more difficult.	34 (49.3 %)
Lack of clarity	The multiplication of digital (communication) channels, i.e., the use of several tools at the same time, leads to a certain lack of clarity.	9 (13,0 %)
Dissolving boundaries	Separation between work and private life is becoming more and more difficult due to digitalized working (from home); working hours are extended, people check their emails again or find it more difficult to switch off.	8 (11.6 %)

Note. Number of mentions refers to the 264 statements extracted from 69 T2 critical incidents. The percentages reflect the proportion of statements that contained a respective mention. Cohen's $\kappa = 0.68$.

existed for both work routines and the acting persons' attitudes. Little flexibility and clinging to the familiar were perceived to impede efficient and long-term work routine changes (“[We] were slowed down a bit in the administration because, for example, we weren't allowed to install the kind of video conferencing stuff that the rest of the world uses, and that was kind of a brake on internationalization,” Interview 144, par. 46).

Resources: Contrary to the rigidity, a general openness toward changing work routines and culture, accompanied by critical engagement with the change processes, were perceived as central

Table 7
Barriers and Resources of Digitalization in the COVID-19 Pandemic.

Category	Description	Number of mentions
Organizational Level		
<i>Barriers</i>		
Lack of preconditions for adapting work routines at home	HEI administration lacks preconditions to fully work from home, especially through the incomplete digitalization of routines & documents (files, written applications instead of email).	60 (19.2 %)
Rigid structures and attitudes	Structures/work routines/acting persons are inflexible, and some employees increasingly cling to structures they have grown fond of. This rigidity of routines and attitudes further complicates the need to digitize work routines. These deficits already existed before the start of the pandemic but are now being felt more strongly due to special circumstances.	19 (6.1 %)
<i>Resources</i>		
COVID-19 management	Appropriate management of the pandemic (understanding for the special situation of individual employees, extending working hours, abolishing time stamping, transparent information culture) acts as a basis for efficient changes.	36 (11.5 %)
Technical equipment & infrastructure	Functioning and appropriate technical equipment (powerful computer, second monitor, headset), as well as structures offering technical support, are regarded as the basis for successfully working from home.	29 (9.3 %)
Team Level		
<i>Resources</i>		
Mutual support, exchange, consideration, trust, cohesion	Mutual support, appropriate information exchange, and strong cohesion between team members are perceived as conducive to successfully managing the crisis together.	42 (13.4 %)
Normalization of digital communication & collaboration	A general openness toward long-term digital communication and collaboration creates meaning in its usage. Advantages of digital collaboration and communication give rise to a desire to normalize and expand them.	12 (3.8 %)
Individual Level		
<i>Barriers</i>		
Complicators for coordinating work & private life	The need for arranging with family members, simultaneous childcare alongside work, caring for relatives, or the lack of proper workspaces at home complicate the coordination of work and private life.	10 (3.2 %)
<i>Resources</i>		
Acceptance of the situation, learning motivation	Embracing situational change and viewing it as an opportunity for the future rather than surrendering or building resistance help in successfully coping with the new requirements.	11 (3.5 %)
Technical competence	Competent handling of technology is crucial for successful work. If technical skills are lacking, it is helpful to acquire them.	8 (2.6 %)

Note. Number of mentions refers to 313 mentions of specific barriers and resources for coping with COVID-19, both within the critical incidents as well as within specific open questions. The percentages reflect the proportion of statements that contained a respective mention. Cohen's $\kappa = 0.73$.

Table 8
Resources of the Long-Term Establishment of Digitalized Work Routines and Software Usage.

Category	Description	Number of mentions
<i>Resources</i>		
Organizational level		
Tool features	Useful tool features and functions (video, screen sharing, distributing tasks, setting status, stability) increase the probability that software will be used (in the long-term).	52 (31.3 %)
Technical equipment & infrastructure	The existence and functioning of technical equipment are the basis for digital work. This includes hardware equipment (laptops, webcams, headsets) and software licenses.	47 (28.3 %)
Offer of tool training and tutorials	Training and tutorials that support employees in handling novel tools.	15 (9.0 %)
Long-term opportunity to work from home	The openness of the administration's management, the superiors, and oneself to work from home in the long-term as a prerequisite for the necessity of digitalized working.	10 (6.0 %)
Team level		
Support structures	Support of any kind from colleagues and superiors, for both content- and emotion-related issues.	19 (11.4 %)
Individual level		
Existing & developed competencies	The perception of one's competencies in the use of digital tools, but also the competencies of colleagues, some of which have developed throughout the COVID-19 pandemic, facilitates their use.	18 (10.8 %)
Positive attitudes	A positive attitude toward digitalization and change, both within the company and among colleagues and superiors, facilitates their establishments.	5 (3.0 %)

Note. Number of mentions refers to the 166 mentions on what participants perceived as specific resources for digitalized work routines and software usage to establish. The percentages reflect the proportion of statements that contained a respective mention. Cohen's $\kappa = 0.86$.

organizational resources for sustainably digitalizing work routines (“*But in principle, I had the feeling that the basic mood was very positive toward the use of new technology, and I thought that helped enormously,*” Interview 232, par. 8). Especially in the context of the COVID-19 pandemic, appropriate management of the situation with all its peculiarities (i.e., appropriate information chains, recognition of individual needs) also served as beneficial for accepting change. As a more tangible resource, the technical equipment of individual employees (hard- and software) and the general technical infrastructure of the administration were reported as prerequisites of efficient digitalization (“*the most important resources I need, they are available to me,*” Interview 246, par. 72). Efficient collaboration tool features, like useful functions or system stability, safety, and usability as well as training and workshops on their usage also served to promote change. Finally, the general openness of the university management in allowing its employees to work location independently in the long-term was identified as a prerequisite of being able to digitalize work routines sustainably.

Team Level. At the team level, resources promoting change processes in the administration could be identified. These mainly included existing support structures within and between teams (“*I would say that my colleagues and superiors are my resources. In the sense of being able to talk to them, to exchange ideas,*” Interview 225, par. 110). Support structures included contact persons for specific difficulties, efficient information exchange, strong team cohesion and trust, and supportive superiors. Additionally, a general openness toward digitalized cooperation at the team level was perceived as a resource for changes to remain

established.

Individual level. Mentions at the individual level included in-person barriers and resources preventing or promoting long-term efficient change.

Barriers: Living circumstances inappropriate for working from home were reported as barriers to the willingness to work fully digitally and from home. Specifically, these circumstances complicated coordinating one's work life and private life, as they required employees to arrange space sharing with other family members or because employees lacked a proper workspace at home.

Resources: Individual resources for changes in work routines included attitudes and competencies. Specifically, participants reported embracing the changes by having positive attitudes toward them, accepting them, and being motivated to adapt to them as facilitators of change. Other resources were competencies in digitalized working that already existed or that developed during the course of the pandemic.

5. Discussion

The study at hand questioned how a sudden external event such as the COVID-19 pandemic affects organizations' digitalization, how short-term changes become sustained in the long-term, and what role resources and barriers play during such organizational change. To answer these questions, we chose to apply a case study design investigating an HEI administration during the first two COVID-19 lockdowns. This case is particularly suitable, as HEIs combine characteristics of both public administrations and private organizations, therefore facing particular barriers while also possessing valuable resources. As assumed, the COVID-19 pandemic rapidly forced the HEI administration to digitalize their ways of working to enable the majority of workers to perform their tasks from home. Accordingly, three main aspects of work processes were digitalized during COVID-19: communication, task division & collaboration, and documents. We condensed our findings in an integrated model (c.f., Fig. 2) displaying the relationships between barriers, resources, and sustainability of change.

Barriers, which are partly inherited from structural properties of traditional public administrations, were assumed to complicate both the short-term handling of the pandemic as well as the long-term establishment of changes. At the same time, HEI administrations were assumed to have specific resources at hand due to their resemblance with private organizations and proximity to innovation and research, which might function as adversaries of barriers and facilitators of change. Our results suggest that this unique linkage of barriers and resources has practical and theoretical applicability: Barriers acted as inhibitors, while resources operated as promoters of both short- and long-term establishment of change in the course of the pandemic. We indeed found structural barriers to exist within HEI that inhibited change. As prior research suggested (e.g., Mergel et al., 2019), rather low digitalization levels kept employees from completely working from home. This was complemented by some level of rigidity, which hampered the usage of certain digital software, such as videoconferencing tools, at the beginning of the pandemic. Still, and in contrast to prior suggestions, we did not observe a substantial negative attitude hindering the implementation of changes that could be attributed to the HEI administration's inherited culture from public administrations (e.g., formality, hierarchies, correctness) (Meijer, 2015; Zeebaree & Aqel, 2021). Indeed, many changes during the COVID-19 pandemic seemed to be born from pragmatism and a mellow interpretation of legislative boundaries that typically hinder change (Mergel et al., 2019). Hence, the “normal way of work” that manifests in the bureaucratic culture was challenged more easily. This was supplemented by the existence of manifold resources. We found that various positive outcomes of changes at the organizational (e.g., technical infrastructure, offers of training), team (e.g., efficient information exchange, trust) and individual levels (e.g., positive attitude toward change) influenced whether that change was perceived as sustainable. Earlier efforts made toward digitalizing the

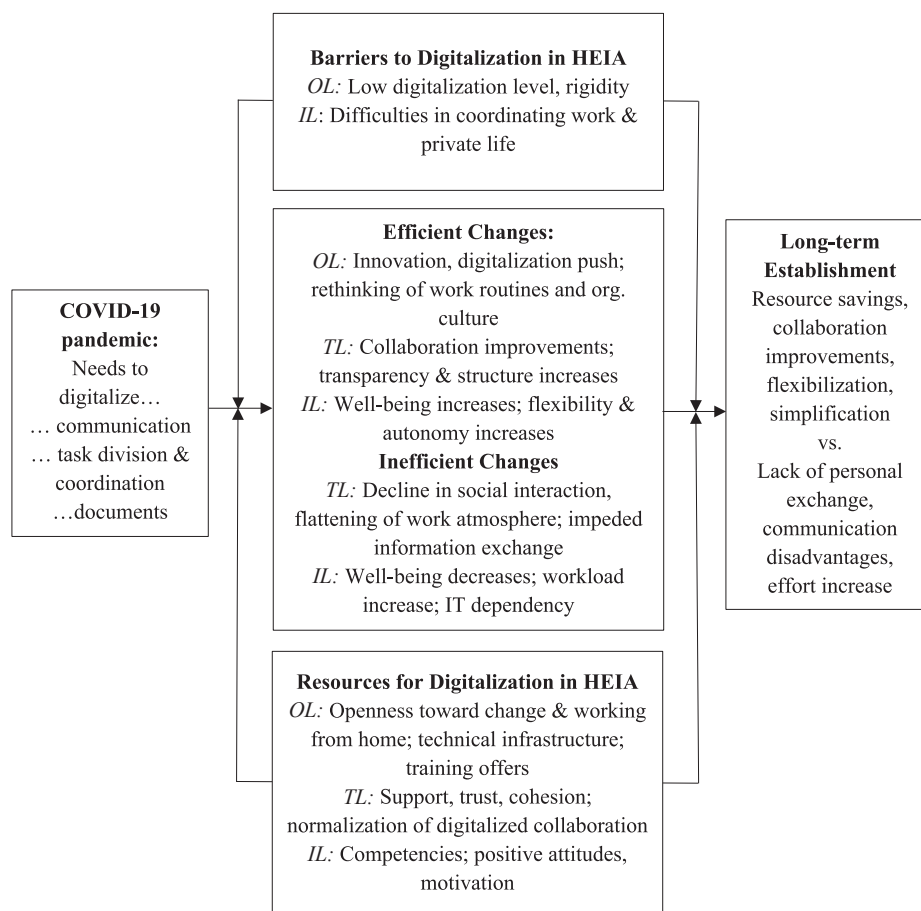


Fig. 2. Integrated Framework of the Study's Main Results. Note. OL = Organizational Level; TL = Team Level; IL = Individual Person Level; HEIA = Higher Education Institution's Administration.

teaching activities of the HEI could have promoted the adoption in the administration by providing an established technical infrastructure (Burki, 2020; Mei et al., 2019).

Furthermore, our results underline that when evaluating the changes caused by the pandemic, it is important to differentiate between the need to be effective, i.e., producing correct outputs for specific demands, and the need to be efficient, i.e., performing with available resources in the most suitable way (Sundqvist et al., 2014). While most changes were generally effective, i.e., enabled the administration to remain working, they were not necessarily efficient. Changes at the different levels were mainly perceived as efficient when relating to the execution of work tasks. Inefficiencies, on the other hand, were largely reported for interpersonal relations and at the team level: Physical distancing and resulting virtual communication negatively affected the general work atmosphere, reduced team identification, and heeled potential for conflict. This supports earlier claims that the formation and preservation of motivation, identification, and trust are more difficult within virtual as compared to face-to-face teams (Hertel et al., 2005). Furthermore, it supports claims that remote working heavily constrains social interactions (Baker et al., 2006; Golden et al., 2008) and risks isolating employees (de Vries et al., 2019; see also Schuster et al., 2020).

Participants in our study expressed the need to sustain the essential services (i.e., being effective) during restrictions of the first lockdown (T1, May/June 2020). At T2, we found that employees started to evaluate the newly established work routines also in terms of their efficiency and compared to pre-pandemic routines. Digitalized work processes were desired and assumed to be sustained in the long-term when they were associated with time savings, transparency increases, or general simplifications of work routines. Interestingly, changes were undesired

to be sustained in the long-term when they negatively affected interpersonal relations (lack of personal exchange, communication disadvantages). However, COVID-19 lockdowns did not only restrict contact at the workplace but in private life as well (Almeida et al., 2020). Hence, isolation and lack of social interaction might have been even more prevalent during the pandemic and may have amplified the issues raised by employees of the HEI, especially during T1.

The mentioned efficient and inefficient changes can also occur simultaneously. For instance, a virtual meeting can save time and travel resources but, at the same time, might be seen as less personal and motivating when communication mainly focuses on work-related content. Thus, depending on the nature of the work, i.e., impersonal vs. interpersonal exchange, different working formats were favored, resulting in a demand for flexibility (Ninaus et al., 2021). Relatedly, the flexibility of having the choice to work from home or the office was recently found to be positively associated with work satisfaction and affective commitment of public administration employees (Becker et al., 2022). It should be noted that flexible working is not the same as hybrid working. Whereas hybrid working formats involve some employees who participate digitally while others are present face-to-face, flexible work allows people to choose between different collaboration media (e.g., whether to conduct a meeting online or face-to-face). In line with extant research on hybrid work, a purely virtual experience has more challenges than purely face-to-face teamwork, especially in terms of team identification (Fiol & O'Connor, 2005). Participants in our study also described hybrid approaches as ineffective and undesirable. Other research also reported experiences in hybrid meetings to be critically shaped by technical infrastructure (e.g., microphones, software) and digital literacy (Saatçi et al., 2019). It remains to be seen whether

advances in the inclusiveness of remote participants or technical infrastructure overcome current limitations and concerns of employees.

Employees' expectations about whether a digitalized work process would be sustainable was found to further depend on the elements of a work process. Flexibility will likely remain relevant for digitalized communication, whereas it may be less important for other use cases, such as digital task sharing, document management, or knowledge management, which are not associated with significant emotional attachment. Still, even for less emotionally charged tasks, concerns exist regarding a lack of perceived clarity when employees must use several systems simultaneously or when they lack trust in an information system (Thielsch et al., 2018). Notably, to forget old routines (Kluge & Gronau, 2018), trust in the new information systems is vital (Meeßen et al., 2020). As trust in (newly) deployed systems during the pandemic was generally high for employees of the HEI, a promising base for the long-term forgetting of analog work routines and the establishment of digitalized ones was formed.

5.1. Theoretical implications

Our research contributes to theoretical knowledge in different ways. First, the COVID-19 pandemic, as a sudden and unforeseen external event, was used to improve the understanding of revolutionary change. While such disruptive events generally rarely occur, the COVID-19 pandemic has been an external event of unprecedented dimension that has transformed not only the world of work but of all life. Thus, COVID-19 represents an example of how quickened organizational change can be achieved using external forces.

Second, only a few researchers have investigated the specifics of HEI administrations to date, both generally and in the context of the COVID-19 pandemic (Dacholfany et al., 2021; Weaver et al., 2022). Demonstrating that HEI administrations combine features of both public administrations and private organizations deepens the understanding of their characteristics, processes, and, ultimately, changes. Our findings further indicate that HEI administrations should not be viewed as equivalents to public administrations, since this would disregard important aspects of their functioning.

Third, our research underlines the relevance of both barriers and resources for understanding change and its sustainability. Prominent theoretical models such as the job demands-resources approach (Bakker & Demerouti, 2007) have already introduced the dualism of hindering and facilitating factors when investigating the workplace, also in the context of crisis (Demerouti & Bakker, 2022). Indeed, we could show that special demands and resources exist in HEI administrations that are related to the perception and the long-term establishment of change. This provides an important contribution for further investigations of change processes, both generally and in HEI administrations.

Our findings further suggest that changes need to be considered at different levels: the organizational, team, and individual levels. We, therefore, extend current change management literature (Whelan-Berry & Gordon, 2000) by showing that a specific change can be perceived differently, depending on the investigated level. These findings contribute to theory by underlining the relevance of considering different levels when investigating change in organizations. On a related note, "soft" measures, such as interpersonal trust or individual engagement, should always be considered next to "hard" facts when evaluating change: Changes can increase the speed of work processes, for instance, but make employees less satisfied. Only investigating specific levels or parameters might result in a biased picture.

Finally, our study underlines the importance of differentiating effectiveness from efficiency when investigating change, especially in the context of the COVID-19 pandemic. While the pandemic has necessitated many effective changes (e.g., working from home), these are not necessarily efficient. Therefore, if the long-term establishment of changes is to be evaluated, special attention should be paid to their efficiency. If circumstances make a change obsolete, it should be the

efficiency of the change itself that makes it persist in the long-term.

5.2. Practical implications

Various practical implications can be derived from the results of our study. The identification of critical barriers and resources for long-term, efficient establishment of digitalization within the interviews serves as an ideal starting point for such derivation. While these hold for the specific context of a pandemic, they can mostly be applied to general change management as well, since serving a higher level of abstraction.

Generally, barriers should be avoided, since they impede change, while resources should be promoted and provided. Specific recommendations derived from our findings that promote HEI administrations during change processes toward digitalization can be found in Table 9.

These recommendations might be summarized as a clear digitalization strategy. HEI administrations and organizations in general should develop a clear concept for digitalization that is well thought-out and coordinated with various people, especially the end users. When developing such a concept, three key findings of our study should be considered: First, organizations should bear in mind that their employees' work satisfaction not only stems from the possibility of effectively performing their tasks but is largely influenced by social factors at work. A significant concern present in the interviews was that social processes could be lost through digitalization, which supports the assumption that social processes are vital to employees. Their maintenance should, therefore, next to efficiency increases, be a core goal of digitalizing work routines. Second, and partly related, a certain amount of flexibility in choosing whether to use digital collaboration tools for certain duties should be granted to employees. Third and finally, participants partly reported on overload and confusion that stemmed from an oversupply of collaboration tools. Tackling digitalization should therefore not result in blind actionism; only as many tools as necessary should be used to cover needs.

5.3. Limitations and future research

When interpreting the results of this paper, some limitations should be considered that open avenues for possible future research. First, we used a qualitative approach for answering the research questions posed. This approach does justice to the novelty of the object of study as well as the specific case of HEI administration and enables in-depth analyses; however, it limits the results in terms of completeness and generalizability. Though our study included quantitative data for evaluating the platforms and tools used, further quantitative research is needed to also validate the relationships assumed in the integrated framework. Thus, our work serves as a starting point for the quantitative verification of assumed associations on the (long-term) impact of revolutionary changes in public sector-related institutions on work routines as well as organizational culture.

Second, the application of a case study approach limited our sample to (a) employees of a specific HEI administration that was (b) located in Germany. Thus, while our study's findings are applicable to the specific context of German HEI administration, they are less generalizable to other forms of organizations (e.g., private organizations) in Germany as well as to HEI administrations in other countries. While (public) administrations have a rather rusty image in Germany and digitalization initiations are rather slow, administrations in other countries are known for their innovative ways of working. For instance, a comparative overview of characteristics of EU administrations' performances provided by the European Commission (2018) revealed that administrations in Estonia, Denmark, and Finland are far further developed in terms of digitalization than those in Germany. Thus, the generalizability of our findings to other countries is limited in that particular barriers and resources might not apply. To increase generalizability, future studies that explicitly consider differences between HEI administrations in different countries would be of interest (see Davison & Martinsons, 2016).

Table 9
Practical Recommendations for HEI Administrations During Change Toward Digitalization.

Level	Problem	Recommendation
Organizational	Lack of preconditions for adapting work routines fully digitally <i>All aspects of work routines should be digitally implementable, to keep the workload constant or, in the best case, reduce it.</i>	- The availability of all preconditions required for digitalizing work routines should be ensured. Therefore, the identification of individual steps of work routines and their digital feasibility are first steps in digitalization processes. - Employees carrying out work routines should be integrated into this process. Their implicit knowledge of the work processes can help to identify critical aspects.
	Closure toward change <i>Employees should perceive their organization as a whole as open toward change and innovation to develop change motivation themselves.</i> Poor technical equipment & infrastructure <i>Required technical equipment for deriving digitalized work routines should be ensured.</i>	- Organizations should generally be open toward change and innovation and communicate it. - Employees should get the chance to contribute their own ideas and suggestions for improvements, which should be dealt with constructively. - The necessary technical equipment should be identified and provided before implementing digitalized work routines. - Satisfaction with and further needs for technical equipment should be surveyed regularly. - Support structures for technical issues should be provided.
Team	Poor tool features <i>Tools should work properly to be readily used.</i> Poor exchange, lack of support, trust, consideration <i>Especially when increasingly working location independently, employees should be able to rely on their colleagues.</i>	- The selection of tools should be well thought-out and based on usage probes from different end users. - Team members should talk openly about their mutual expectations. - Exchange should be encouraged, e.g., through regular meetings. - Regular team-building activities should be implemented. - Team members should have an overview of where the competencies lie in the team and when to approach whom.
	Closure toward digital collaboration <i>Teams should work as one without single members closing off toward digital collaboration.</i>	- Digital collaboration, its consequences, and any reservations and fears toward it should be discussed openly, constructively, and regularly within the team. - Solutions that everyone can identify with should be found.
Individual	Lack of change motivation, negative attitude toward change <i>Employees should be made aware of the meaningfulness and positive consequences of the change.</i>	- Change processes should be communicated openly and in a positive manner. - Employees should have the possibility to ask questions and actively participate. - Supervisors should observe whether single employees have negative attitudes toward change and actively seek conversation.
	Lack of (technical) competence <i>Employees should feel competent and safe while carrying out digital work routines.</i>	- Training, workshops, and seminars should be offered for the development of specific competencies. - Needs assessments should be conducted regularly.

Third, both data collection waves occurred during lockdowns in Germany, and results on the long-term establishment of changes were based on participants' expectations. To investigate whether changes actually remain established in the long-term, further studies after COVID-19 restrictions would be of interest.

Finally, the retrospective nature of the interview study is another limitation of our study. Since memories are prone to error (Serrat, 2017), results can be unreliable. To compensate for this, a diary study would be conceivable to record concrete events at several points in time during a day.

6. Conclusion

The COVID-19 pandemic has been a wake-up call for organizations and further strengthened the need to digitalize work routines and develop openness toward change and innovation. The present study considered the particular case of an administration in a higher education institution in the course of the COVID-19 pandemic as an external trigger of change in work routines and organizational culture, especially considering digitalization. Results suggested that even though barriers, like rigid structures and low digitalization levels, restricted the administration's possibilities to efficiently react to COVID-19 challenges, a surprising openness toward innovation and digitalized ways of working served as a core resource and resulted in the occurrence of various efficient changes. Short-term changes that occurred during the COVID-19 lockdowns in order to maintain the administration's functioning were also largely expected to be sustained in the long-term. The availability of good technical equipment and support, both from the employer as well as within team structures, were found to serve as significant resources for the changes to become more established.

The research proposed in this work is pioneering for at least three reasons. First, change is explored in light of the COVID-19 pandemic, a sudden crisis that demanded immediate actions to maintain central organizational functions. Second, it investigates barriers and resources in the context of organizational change, and not solely at the individual level. Third, it investigates the special case of a higher education administration, a context facing a conglomeration of barriers and

resources, both structurally and culturally.

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CRedit authorship contribution statement

Lea S. Müller: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. **Sebastian Reiners:** Writing – original draft, Visualization, Conceptualization. **Jörg Becker:** Writing – review & editing, Supervision, Conceptualization. **Guido Hertel:** Writing – review & editing, Supervision, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Albrecht, S. L., Connaughton, S., Foster, K., Furlong, S., & Yeow, C. J. L. (2020). Change engagement, change resources, and change demands: A model for positive employee orientations to organizational change. *Frontiers in Psychology, 11*, Article 531944. <https://doi.org/10.3389/fpsyg.2020.531944>

- Almeida, F., Duarte Santos, J., & Augusto Monteiro, J. (2020). The challenges and opportunities in the digitalization of companies in a post-COVID-19 world. *IEEE Engineering Management Review*, 48(3), 97–103. <https://doi.org/10.1109/EMR.2020.3013206>
- Amankwah-Amoah, J., Khan, Z., Wood, G., & Knight, G. (2021). COVID-19 and digitalization: The great acceleration. *Journal of Business Research*, 136, 602–611. <https://doi.org/10.1016/j.jbusres.2021.08.011>
- Baker, P. M., Moon, N. W., & Ward, A. C. (2006). Virtual exclusion and telework: Barriers and opportunities of technocentric workplace accommodation policy. *Work*, 27(4), 421–430.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
- Baroudi, J. J., & Orlikowski, W. J. (1988). A short-form measure of user information satisfaction: A psychometric evaluation and notes on use. *Journal of Management Information Systems*, 4(4), 44–59. <https://doi.org/10.1080/07421222.1988.11517807>
- Becker, C., Thörel, E., Pauls, N., & Göritz, A. S. (2022). Homeoffice in Corona-Zeiten – Sind Ausmaß und/oder Flexibilität wichtig für Arbeitszufriedenheit, soziale Unterstützung, Commitment und Arbeitsunterbrechungen? [Working at home during Covid-19 – Are extent and/or flexibility important for job satisfaction, social support, commitment and work interruptions?]. *Gruppe. Interaktion. Organisation. Zeitschrift Für Angewandte Organisationspsychologie (GIO)*, 53, 173–187. <https://doi.org/10.1007/s11612-022-00630-z>
- Boyne, G. A. (2002). Public and private management: What's the difference? *Journal of Management Studies*, 39(1), 97–122. <https://doi.org/10.1111/1467-6486.00284>
- Breuer, C., Hüffmeier, J., Hibben, F., & Hertel, G. (2020). Trust in teams: A taxonomy of perceived trustworthiness factors and risk-taking behaviors in face-to-face and virtual teams. *Human Relations*, 73(1), 3–34. <https://doi.org/10.1177/0018726718818721>
- Burki, T. K. (2020). COVID-19: Consequences for higher education. *The Lancet Oncology*, 21(6), 758. [https://doi.org/10.1016/S1470-2045\(20\)30287-4](https://doi.org/10.1016/S1470-2045(20)30287-4)
- Butterfield, L. D., Borgen, W. A., Amundson, N. E., & Maglio, A.-S.-T. (2005). Fifty years of the critical incident technique: 1954–2004 and beyond. *Qualitative Research*, 5(4), 475–497. <https://doi.org/10.1177/146879410506924>
- Chesbrough, H. (2010). Business model innovation: Opportunities and barriers. *Long Range Planning*, 43(2–3), 354–363. <https://doi.org/10.1016/j.lrp.2009.07.010>
- Chowdhury, M. T., Sarkar, A., Paul, S. K., & Moktadir, M. A. (2020). A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry. *Operations Management Research*, 15, 166–178. <https://doi.org/10.1108/10878570710833714>
- Dacholfany, M. I., Noor, T. R., Diana, E., Nurzen, S. M., & Prayoga, D. (2021). Identification of higher education administration applications efforts to improve digital-based academic services. *Linguistics and Culture Review*, 5(S2), 1402–1414. <https://doi.org/10.21744/lingcure.v5n2.1948>
- Davison, R. M., & Martinsons, M. G. (2016). Context is king! Considering particularism in research design and reporting. *Journal of Information Technology*, 31(3), 241–249. <https://doi.org/10.1057/jit.2015.19>
- de Boer, H., Enders, J., & Schimank, U. (2007). On the way towards new public management? The governance of university systems in England, the Netherlands, Austria, and Germany. In D. Jansen (Ed.), *New Forms of Governance in Research Organizations (Issue January)* (pp. 137–152). Dordrecht: Springer. https://doi.org/10.1007/978-1-4020-5831-8_5
- Demerouti, E., & Bakker, A. B. (2022). Job demands-resources theory in times of crises: New propositions. *Organizational Psychology Review*, 204138662211350. <https://doi.org/10.1177/20413866221135022>
- Dencker, J. C. (2006). Revolutionary or evolutionary change? A tale of two labor market structures. In J. J. Martocchio (Ed.), *Research in Personnel and Human Resources Management* (pp. 1–25). Emerald Group Publishing Limited. [https://doi.org/10.1016/S0742-7301\(06\)25001-1](https://doi.org/10.1016/S0742-7301(06)25001-1)
- Denhardt, J. v., & Denhardt, R. B. (2015). *The new public service: Serving, not steering*. Routledge.
- de Vries, H., Tummers, L., & Bekkers, V. (2019). The benefits of teleworking in the public sector: Reality or rhetoric? *Review of Public Personnel Administration*, 39(4), 570–593. <https://doi.org/10.1177/0734371X18760124>
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, 21(10–11), 1105–1121. [https://doi.org/10.1002/1097-0266\(200010/11\)21:10<1105::AID-SMJ133>3.0.CO;2-E](https://doi.org/10.1002/1097-0266(200010/11)21:10<1105::AID-SMJ133>3.0.CO;2-E)
- Etezadi-Amoli, J., & Farhoomand, A. F. (1996). A structural model of end user computing satisfaction and user performance. *Information & Management*, 30(2), 65–73. [https://doi.org/10.1016/0378-7206\(95\)00052-6](https://doi.org/10.1016/0378-7206(95)00052-6)
- European Commission, Directorate-General for Employment Social Affairs and Inclusion, Palaric, E., Thijs, N., & Hammerschmid, G. (2018). *A comparative overview of public administration characteristics and performance in EU28*.
- Fiol, C. M., & O'Connor, E. J. (2005). Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. *Organization Science*, 16(1), 19–32. <https://doi.org/10.1287/orsc.1040.0101>
- FitzGerald, K., Seale, N. S., Kerins, C. A., & McElvaney, R. (2008). The critical incident technique: A useful tool for conducting qualitative research. *Journal of Dental Education*, 72(3), 299–304. <https://doi.org/10.1002/j.0022-0337.2008.72.3.tb04496.x>
- Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin*, 51(4), 327–358. <https://doi.org/10.1037/h0061470>
- Golden, T. D., Veiga, J. F., & Dino, R. C. A. (1996). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology*, 93(6), 1412–1421. <https://doi.org/10.1037/a0012722>
- Hertel, G., Geister, S., & Konrad, U. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review*, 15(1), 69–95. <https://doi.org/10.1016/j.hrmr.2005.01.002>
- Hertel, G., Konrad, U., & Orlikowski, B. (2004). Managing distance by interdependence: Goal setting, task interdependence, and team-based rewards in virtual teams. *European Journal of Work and Organizational Psychology*, 13(1), 1–28. <https://doi.org/10.1080/13594320344000228>
- Hofmann, S., & Ogonek, N. (2018). Different but still the same? How public and private sector organisations deal with new digital competences. *The Electronic Journal of E-Government*, 16(2), 127–135.
- Jones, G. R. (2013). *Organizational theory, design and change*. Pearson Education Limited.
- Jreisat, J. E. (1997). *Politics without process: Administering development in the Arab world*. Lynne Rienner Publishers.
- Kluge, A., & Gronau, N. (2018). Intentional forgetting in organizations: The importance of eliminating retrieval cues for implementing new routines. *Frontiers in Psychology*, 9, 51. <https://doi.org/10.3389/fpsyg.2018.00051>
- Lee, Y.-C., Malcein, L. A., & Kim, S. C. (2021). Information and communications technology (ICT) usage during COVID-19: Motivating factors and implications. *International Journal of Environmental Research and Public Health*, 18(7), 3571. <https://doi.org/10.3390/ijerph18073571>
- Lewis, J. R., Utesch, B. S., & Maher, D. E. (2013). UMUX-LITE - When there's no time for the SUS. *CHI '13: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2099–2102. <https://doi.org/10.1145/2470654.2481287>
- Makarius, E. E., Mukherjee, D., Fox, J. D., & Fox, A. K. (2020). Rising with the machines: A sociotechnical framework for bringing artificial intelligence into the organization. *Journal of Business Research*, 120, 262–273. <https://doi.org/10.1016/j.jbusres.2020.07.045>
- Mascio, F. D., Natalini, A., & Cacciatore, F. (2020). Public administration and creeping crises: Insights from COVID-19 pandemic in Italy. *The American Review of Public Administration*, 50(6–7), 621–627. <https://doi.org/10.1177/0275074020941735>
- Mayring, P., & Fenzl, T. (2014). *Qualitative Inhaltsanalyse*. In N. Baur, & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 543–556). Springer VS.
- McKnight, D. H., Carter, M., Thatcher, J. B., & Clay, P. F. (2011). Trust in a specific technology: An investigation of its components and measures. *ACM Transactions on Management Information Systems*, 2(2), 1–25. <https://doi.org/10.1145/1985347.1985353>
- Meeßen, S. M., Thielsch, M. T., & Hertel, G. (2020). Trust in management information systems (MIS): A theoretical model. *Zeitschrift für Arbeits- und Organisationspsychologie*, 64(1), 6–16. <https://doi.org/10.1026/0932-4089/a000306>
- Meijer, A. (2015). E-governance innovation: Barriers and strategies. *Government Information Quarterly*, 32(2), 198–206. <https://doi.org/10.1016/j.giq.2015.01.001>
- Mei, X. Y., Aas, E., & Medgard, M. (2019). Teachers' use of digital learning tool for teaching in higher education: Exploring teaching practice and sharing culture. *Journal of Applied Research in Higher Education*, 11(3), 522–537. <https://doi.org/10.1108/JARHE-10-2018-0202>
- Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, 36(4), Article 101385. <https://doi.org/10.1016/j.giq.2019.06.002>
- Merriam, S. B. (2002). Introduction to qualitative research. In S. B. Merriam, & R. S. Grenier (Eds.), *Qualitative Research in Practice: Examples for Discussion and Analysis* (pp. 1–17). Jossey-Bass.
- Meyerson, D., & Martin, J. (1987). Cultural change: An integration of three different views. *Journal of Management Studies*, 24(6), 623–647. <https://doi.org/10.1111/j.1467-6486.1987.tb00466.x>
- Micelotta, E., Lounsbury, M., & Greenwood, R. (2017). Pathways of institutional change: An integrative review and research agenda. *Journal of Management*, 43(6), 1885–1910. <https://doi.org/10.1177/0149206317699522>
- Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1), 23–48.
- Musselin, C. (2018). New forms of competition in higher education. *Socio-Economic Review*, 16(3), 657–683. <https://doi.org/10.1093/SER/MWY033>
- Navarro, J. R., & Gallardo, F. O. (2003). A model of strategic change: Universities and dynamic capabilities. *Higher Education Policy*, 16(2), 199–212. <https://doi.org/10.1057/palgrave.hep.8300016>
- Ninaus, K., Diehl, S., & Terlutter, R. (2021). Employee perceptions of information and communication technologies in work life, perceived burnout, job satisfaction and the role of work-family balance. *Journal of Business Research*, 136(July), 652–666. <https://doi.org/10.1016/j.jbusres.2021.08.007>
- Nutt, P. C. (2000). Decision-making success in public, private and third sector organisations: Finding sector dependent best practice. *Journal of Management Studies*, 37(1), 77–108. <https://doi.org/10.1111/1467-6486.00173>
- Nutt, P. C., & Backoff, R. W. (1993). Organizational publicness and its implications for strategic management. *Journal of Public Administration Research and Theory*, 3(2), 209–231. <https://doi.org/10.1093/oxfordjournals.jpart.a037167>
- Ogonek, N., & Becker, J. (2018). Can we learn from Down Under how to rise up in e-government? A comparative analysis of the public sector competences in the German and Australian higher education systems. *Proceedings of the Hawaii International Conference on System Sciences*, 2018, 2256–2265.
- Rhoades, L., Eisenberger, R., & Armeli, S. (2001). Affective commitment to the organization: The contribution of perceived organizational support. *Journal of Applied Psychology*, 86(5), 825–836. <https://doi.org/10.1037/0021-9010.86.5.825>
- Robertson, P. J., & Seneviratne, S. J. (1995). Outcomes of planned organizational change in the public sector: A meta-analytic comparison to the private sector. *Public Administration Review*, 55(6), 547–558. <https://doi.org/10.2307/3110346>

- Rosenbloom, D. H., O'leary, R., & Chanin, J. (2017). *Public Administration and Law* (3rd ed.). Routledge. <https://doi.org/10.4324/9781315089348>.
- Saatçi, B., Rädle, R., Rintel, S., O'Hara, K., & Nylandsted Klokmoose, C. (2019). Hybrid meetings in the modern workplace: Stories of success and failure. In Nakanishi H, Egi H, Chounta I, Takada H, Ichimura S, & Hoppe U (Eds.), *Collaboration Technologies and Social Computing* (1st ed., pp. 45–61). Springer Cham. https://doi.org/10.1007/978-3-030-28011-6_4.
- Schuster, C., Weitzman, L., Sass Mikkelsen, K., Meyer-Sahling, J., Bersch, K., Fukuyama, F., Paskov, P., Rogger, D., Mistree, D., & Kay, K. (2020). Responding to COVID-19 through surveys of public servants. *Public Administration Review*, 80(5), 792–796. <https://doi.org/10.1111/puar.13246>.
- Serrat, O. (2017). Knowledge solutions: Tools, methods, and approaches to drive organizational performance. *Springer Nature*. <https://doi.org/10.1007/978-981-10-09839>
- Shoss, M. (2021). Occupational health psychology research and the COVID-19 pandemic. *Journal of Occupational Health Psychology*, 26(4), 259–260. <https://doi.org/10.1037/ocp0000292>
- Stanton, J. M., Balzer, W. K., Smith, P. C., Parra, L. F., & Ironson, G. (2001). A general measure of work stress: The stress in general scale. *Educational and Psychological Measurement*, 61(5), 866–888. <https://doi.org/10.1177/00131640121971455>
- Sundqvist, E., Backlund, F., & Chronéer, D. (2014). What is project efficiency and effectiveness? *Procedia - Social and Behavioral Sciences*, 119(19), 278–287. <https://doi.org/10.1016/j.sbspro.2014.03.032>
- Thielsch, M. T., & Hirschfeld, G. (2019). Facets of website content. *Human-Computer Interaction*, 34(4), 279–327. <https://doi.org/10.1080/07370024.2017.1421954>
- Thielsch, M. T., Meeßen, S. M., & Hertel, G. (2018). Trust and distrust in information systems at the workplace. *PeerJ*, 6, e5483.
- Thielsch, M. T., Röseler, S., Kirsch, J., Lamers, C., & Hertel, G. (2021). Managing pandemics—Demands, resources, and effective behaviors within crisis management teams. *Applied Psychology*, 70(1), 150–187. <https://doi.org/10.1111/apps.12303>
- Vial, G. (2021). Understanding digital transformation: A review and a research agenda. *Managing Digital Transformation*, 28(2), 13–66. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Weaver, G. C., Rabbitt, K. M., Summers, S. W., Phillips, R., Hottenstein, K. N., & Cole, J. M. (2022). Acute crisis leadership in higher education: Lessons from the pandemic. *Taylor & Francis*. <https://doi.org/10.4324/9781003239918>
- Wegrich, K. (2020). Is the turtle still plodding along? Public management reform in Germany. *Public Management Review*, 23(8), 1107–1116. <https://doi.org/10.1080/14719037.2020.1771011>
- Weiner, B. J. (2009). A theory of organizational readiness for change. *Implementation Science*, 4(1), 1–9. <https://doi.org/10.1186/1748-5908-4-67>
- Whelan-Berry, K. S., & Gordon, J. R. (2000). Effective organizational change: New insights from multi-level analysis of organizational change process. *Academy of Management Proceedings*, 2000(1), D1–D6. <https://doi.org/10.5465/apbpp.2000.5535221>
- Zeebaree, M., & Aqel, M. (2021). A weight-analysis technique of existing research on e-government implementation challenges in developing countries. *Journal of Optimization in Industrial Engineering*, 14(1), 159–176. [10.22094/JOIE.2020.677842](https://doi.org/10.22094/JOIE.2020.677842).

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