



Staying afloat amidst extreme uncertainty: A case study of digital transformation in Higher Education

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ABSTRACT

Prior research has undertheorized the profound impact of digital technologies by dwelling on the implications of individual technologies on distinct organizational dimensions to explain the phenomenon of digital transformation. This study adopts a view of digital transformation as organizational change that is facilitated by digital technologies and has the potential to reshape every aspect of an organization. The paper aims to explore the underpinning mechanisms of a Higher Education Institution in managing digital transformation and capitalizing upon the benefits of digital technologies amidst extreme uncertainty. We engage in a qualitative, in-depth case study of a UK-based Higher Education Institution to empirically explore the combination of digital technologies and transfiguration of its organizational dimensions during the Covid-19 pandemic. Our findings highlight three mechanisms: *fostering technologies to stay afloat*, *scaling functionalities to create new value*, and *justifying value to design change*. Our contribution is threefold. First, we capture the conjugation of digital technologies and transfiguration of business processes, strategy, and culture in a paradigmatic case of digital transformation. Second, we articulate the mechanisms through which our case organization managed such transformation. Third, we demonstrate that extreme uncertainty catalyzed rather than hindered digital transformation.

1. Introduction

Digital technologies are more impactful than ever, affecting the internal and external environment of all forms of organizations (e.g., Yoo et al., 2010; Henfridsson et al., 2014), which often need to go through a fundamental transformation to capitalize upon the benefits of their digital capabilities. Extant research has associated the transformational impact of digital technologies with the phenomenon of digital transformation (e.g., Vial, 2019). IS research, over the last decades, has scrutinized the impact of technology on organizations (e.g., Orlikowski and Baroudi, 1991; Orlikowski, 1992; Sambamurthy and Zmud, 2000; Sambamurthy et al., 2003; Yoo et al., 2010) and how Information Technology (IT) drives organizational change (e.g., Markus and Robey, 1988; Robey et al., 2013; Markus, 2004; Davenport, 1993). However, the impact of digital technologies is disruptive, with complexities that arise from their constant re-shaping and the almost unlimited combinations they offer. Most studies have investigated the phenomenon of digital transformation only in part, either by focusing on individual

technologies and their implications on organizations or by adopting a narrow focus on specific organizational dimensions such as processes, culture, and strategy (Sambamurthy et al., 2003; Sambamurthy and Zmud, 2000). Therefore, a more holistic understanding of how a plethora of technologies may reshape multiple organizational dimensions is still missing.

In this paper, we conceptualize digital transformation as organizational change that is facilitated by digital technologies and has the potential to reshape every aspect of an organization to fully leverage its core competencies. Under this lens, digital transformation is not a singular, accomplished event, but requires a radical modification of the underlying business infrastructure via profound organizational change that entails “*enactment(s) - unfolding process(es) involving actors making choices interactively, in inescapably local conditions, by drawing on broader rules and resources*” (Tsoukas and Chia, 2002, p.577). Important aspects of such organizational change are the uncertainty involved in the transformation itself (e.g., Bordia et al., 2004) and the inherent uncertainties related to the digital technologies involved (Hanseth and

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Lyytinen, 2010; Antonopoulou and Begkos, 2020). In addition, there is exogenous uncertainty due to continuous advancements in digital technologies, erratic changes in customer preferences and demand, and ever-changing contextual conditions that constitute efforts towards organizational change a convoluted balancing act. Further uncertainty manifests in tandem with global challenges and crises (e.g., climate change and energy crises, financial recession, natural disasters, geopolitical turmoil etc.) which pose additional hurdles to governments and organizations. Testament to such extreme uncertainty is the Covid-19 pandemic that disrupted all facets of everyday and organizational life. In light of the above, how digital transformation as organizational change manifests amidst multifaceted and extreme uncertainty is an important issue that has not yet been scholarly captured.

In this paper, we draw on organizational change and digital transformation literature to explore the research question: *What are the underpinning mechanisms that a Higher Education Institution engages upon to manage digital transformation amidst extreme uncertainty?* To answer our research question, we conducted an in-depth case study (Gerring, 2007) of a UK-based Institution in Higher Education, pseudonymized as Akademia, during the Covid-19 pandemic. Higher Education Institutions (HEIs) are no stranger to digital transformation (Alam et al., 2020) but the path towards it is often fraught with difficulties. Enterprise Resource Planning (ERP) software, computer systems and video technologies, social media, simulations and Artificial Intelligence, are only some examples of the pervasiveness of diverse digital technologies in HEIs (Rippa and Secundo, 2019; Núñez-Canal et al., 2022; Secundo et al., 2020). We were intrigued with this setting as there are increasing studies that look into the impact of technologies on Higher Education (e.g., Alam, 2021; Alam and Asimiran, 2021; Alam and Parvin, 2021), such as their benefits on online delivery (e.g., Alam, 2021) or the use of gamification to enhance teaching practices (Grijalvo et al., 2022). However, the investigation of the adoption of individual technologies only partially describes the phenomenon of digital transformation amidst uncertainty and there is still a need for a better understanding of the underpinning mechanisms of managing widespread change in such organizations.

Our paper contributes to the nexus of organizational change and digital transformation literature in three ways. First, we capture the conjugation of digital technologies and the transfiguration of business processes, strategy, and culture in a paradigmatic case of digital transformation. Second, our paper articulates three mechanisms through which our case organization managed such transformation, namely, fostering technologies to stay afloat, scaling functionalities to create new value, and justifying value to design change. Third, we demonstrate that extreme uncertainty such as the Covid-19 pandemic catalyzed rather than hindered digital transformation in our case setting.

The remainder of this paper is structured as follows: first, we present an overview of existing literature in organizational change and technology-driven organizational change. We further problematize digital transformation as organizational change to investigate the difference with seminal writings on Information Technology (IT) and organizational change. In the following section, we describe our research setting and outline our methodological approach. This is followed by the presentation of our empirical findings and analysis. Next, we draw on this analysis to answer our research question and offer new insights. Finally, we present the theoretical and empirical implications of our study, outline its limitations, and make suggestions for future research.

2. Related research and conceptual basis

2.1. Organizational change and the role of technology

Over the last decades, researchers have scrutinized the notion of organizational change and widely acknowledge that it involves substantial and widespread modifications in organizational practices, along

with simultaneous permutations in key activity domains such as strategy, internal processes, and power distribution (e.g., Orlikowski and Iacono, 2001; Davenport, 1993; Van de Ven and Poole, 1995; Wischnevsky and Damanpour, 2006). Organizational transformation may manifest in a rapid and rigorous manner or over a prolonged period of time (e.g., By, 2005; Burnes, 2004; Orlikowski, 1996). Davenport (1993) highlights that “*organizational change involves broad change not only in work processes, but also other dimensions of an organization such as organizational structure, strategy and business capabilities*” (p.125). Some scholars adopt a more dynamic approach to further discuss how organizational change evolves and highlight its characteristics. For example, Romanelli and Tushman (1994) argue that organizational transformation is a complex and continuous process that dictates fundamental changes in organizational structures and systems. Later, MacIntosh and MacLean (1999) highlight that organizational change reflects sudden, unexpected and dramatic change. Weick and Quinn (1999) characterize organizational change as “*episodic, discontinuous and intermittent*” (p.362) and Levy and Merry (1986) as “*multidimensional, multi-level, qualitative, discontinuous, radical*” (p.5).

Furthermore, there is a wide IS literature on the impact of technology on organizations (e.g., Orlikowski and Baroudi, 1991; Orlikowski, 1992; Sambamurthy and Zmud, 2000; Sambamurthy et al., 2003; Yoo et al., 2010) and how IT drives organizational change (e.g., Markus and Robey, 1988; Robey et al., 2013; Markus, 2004; Davenport, 1993). Within this context, it is technologies' affordances that allow organizations to alter the quality of goods or services, reduce operational costs, maximize time efficiencies and re-engineer business processes to gain competitive advantage (Eason, 1989; Liere-Netheler et al., 2018; Neumeier et al., 2017; Davenport, 1993). Research broadly considers IT as an enabler or driver of new organizational forms and structures that aims to increase an organization's scale of operations (Banker et al., 1990; Dedrick et al., 2003; Brynjolfsson and Yang, 1996), and that organizational change is typically pre-determined and occurs over a brief interval of time (Wischnevsky and Damanpour, 2006).

In addition, extant literature emphasizes the role of IT capabilities in optimizing, and often automating, business processes. IT is widely viewed as a back-office support function that streamlines activities such as payroll and resource planning, facilitates the efficient allocation of resources to any particular business unit or process, and overall empowers an organization's functional strategy (Henderson and Venkatraman, 1990; Brynjolfsson and Hitt, 2000; Brynjolfsson and Yang, 1996). Such literature reaches two important conclusions. First, that technology has surface-level effects (Baptista et al., 2020; Cecez-Kecmanovic et al., 1999; Bansler et al., 2000). IT resources alone do not provide competitive advantage; rather, firms gain competitive advantage by leveraging complementarities among people, culture, strategy, and processes (Dedrick et al., 2003; Murnane et al., 1999). In other words, IT infrastructure is not part of the strategic management of the organization and does not imbue a radical modification of the overall business. Second, IT-driven organizational change is predetermined, scheduled and with well-defined implications. Such ‘deterministic’ views advocate that organizations are contingent on specific technologies and the work to be carried out (e.g., Perrow, 1967) and do not examine the reciprocal relationship between technology and organizational actors. For example, Orlikowski (2000) highlights the importance of human agency that influences the choices about technology within the organization, and Robey and Boudreau (1999) argue that this dynamic and reciprocal relationship has no predetermined outcomes.

However, digital technologies may often prove disruptive to an organization's status quo, and force firms to undergo a fundamental transformation of their business infrastructure¹ to ensure alignment with their business strategy (Benner, 2007, 2010; Henfridsson et al.,

¹ Business infrastructure refers to a collection of Information Systems and boundary resources leveraged by the firm for business purposes

2009; Lavie, 2006; Tripsas and Gavetti, 2000). Therefore, the aforementioned views on technology-driven organizational transformation only partially apply to organizational change implicated by digital technologies. This paucity of research motivates our scholarly attention to further understand digital transformation as an alternative form of organizational change.

Scholars, over the last decade, acknowledge the importance of emerging digital technologies and provide insight into the particular attributes that differentiate digital from technological artifacts (e.g., Yoo et al., 2010; Kallinikos et al., 2013; Tiwana et al., 2010). For example, their increasing interconnectivity, their constant unfolding as a result of their intentional incompleteness, the ease of re-programmability and data homogenisation, make such innovations easy to reconfigure (Yoo et al., 2010; Kallinikos et al., 2013; Tiwana et al., 2010; Huang et al., 2017), thus providing open and flexible affordances for organizational change. In addition, digital infrastructures as the “collection of technological and human components, networks, systems, and processes that contribute to the functioning of an information system” (Henfridsson and Bygstad, 2013; p.908) affect the internal and external environment of all forms of organizations (Tilson et al., 2010; Koutsikouri et al., 2018; Øvrelid and Bygstad, 2019), thus imposing further challenges to firms that need to materialize profound changes beyond their technological infrastructure and across multiple organizational dimensions to capitalize upon the offerings of digital technologies. For this reason, an increasing body of research employs the notion of digital transformation and aims to explore the nexus of digital technologies and organizational change.

2.2. Digital transformation and organizational change

The study of digital transformation has attracted considerable attention in recent years (Vial, 2019; Bresciani et al., 2021). Despite the plethora of views on how digital transformation is conceptualized, there is common ground on the reciprocal relationship between digital technologies and the transformation of multiple organizational dimensions. We draw on digital transformation and the wider organizational change literature to theoretically position our study. We conceptualize digital transformation as organizational change that is implicated by the conjugation of digital technologies and address the aforementioned paucity of research by exploring the underpinning mechanisms in managing the transfiguration of business processes, culture² and strategy. In what follows, we offer a review of related literature and a conceptual basis by which to address these considerations.

A view of digital transformation that is anchored in organizational change literature allows us to highlight various organizational aspects that have been investigated only in part. For example, some scholars discuss digital transformation in terms of strategy (Bharadwaj et al., 2013; Bresciani et al., 2021; Matt et al., 2015). Within this strand of research, studies primarily focus on exploring the transformation of business strategy to remain competitive (Bharadwaj et al., 2013; Matt et al., 2015) owing to digital transformation's “cross-functional character” (Matt et al., 2015, p.342) and highlighting digital technologies' capacity to revolutionize organizations, markets, or even societies. Along these lines, Hess et al. (2016) argue that organizations devise “strategies that embrace the implications of digital transformation and drive better operational performance” (p. 123) and Bharadwaj et al., (2013) highlight the need to “rethink the role of IT strategy, from that of a functional-level strategy - aligned but essentially always subordinate to business strategy - to one that reflects a fusion between IT strategy and business strategy” (p.471).

Others discuss digital transformation in tandem with the transformation of organizational structures and investigate new ways of creating digital mindsets or new organizational roles (for example, the

role of Chief Digital Officers - CDOs) (e.g., Colbert et al., 2016; Horlacher et al., 2016; Firk et al., 2021; Singh and Hess, 2020). These views explore human agency and tangential notions of scepticism, distrust, management intentions, and strategic actions. Such studies demonstrate the implications of digital transformation on human workforce and often stress the need of staff training for the development of new skills. For example, Colbert et al. (2016) highlight the organizational importance of establishing a workforce that is digitally astute, Begkos and Antonopoulou (2022) investigate how technologies mediate the hybridization of professionals in lower organizational levels, and Dremel et al. (2017) highlight that the cultivation of employees' analytical skills is crucial in solving complex business problems. Similarly, studies discuss the establishment of new roles such as that of CTOs (Chief Technology Officers), closely collaborating with CIOs (Chief Information Officers) and CFOs (Chief Financial Officers) to ensure alignment with a firm's organizing logic (Horlacher and Hess, 2016; Sambamurthy and Zmud, 2000).

In addition, extant literature discusses digital transformation in relation to the adoption of digital technologies to transform business processes (e.g., Tiago and Veríssimo, 2014; Demirkan et al., 2016) and create more or new forms of value through alternative value creation paths (Vial, 2019). In fact, this strand of literature argues that digital technology creates new sources of customer value, may increase operational agility in customer service, and triggers changes that provide the means for organizations to improve competitiveness (Henderson and Venkatraman, 1990). However, a comprehensive understanding of how multiple technologies can collectively transform functional and strategic areas of an organization is still missing (Vial, 2019; Matt et al., 2015; Bresciani et al., 2021).

With the existing views of digital transformation and organizational change driven by IT as a backdrop, there are pivotal differences that make digital transformation distinct. First, the notion of digital transformation is often interchangeably used with digitalization, yet digital transformation does not reflect the mere adoption of a single technology such as an ERP system. Digitalization is “a sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural” (Tilson et al., 2010; p. 749), a definition that does not imply fundamental organizational change. In this vein, digitalization constitutes a prerequisite for digital transformation to manifest. Digital transformation relates to the adoption of multiple technologies that are both interconnected and independent. Digital technologies are unbounded to their original intent (Nambisan, 2013; Yoo, 2013; Yoo et al., 2010; Antonopoulou and Begkos, 2020) and, in this regard, they can be used for multiple purposes and in almost unlimited combinations that facilitate a range of uses. Existing work though does not provide enough insight into the role of multiple digital technologies in digital transformation.

Second, digital transformation impacts every business function. In marketing, for example, social media, platforms and big data, among others, change traditional marketing approaches (e.g., Duffett et al., 2019; Graesch et al., 2020). In supply chains, technologies such as ERPs, Artificial Intelligence, Blockchain and 3D Printing change the nature of work along global value chains, be it in suppliers' factories, distribution facilities or in the delivery of products and services to customers (e.g., Liu et al., 2016; Nasiri et al., 2020). Also, in accounting and finance, financial and blockchain technologies, as well as platforms and performance management systems, among others, change traditional processes and practices, such as financial reporting, valuations and forecasting (e.g., Moll and Yigitbasoglu, 2019; Bhimani and Willcocks, 2014; Begkos and Antonopoulou, 2020). Along these lines, there is a need to capture the transformational impact of multiple technologies with a more inclusive focus on the fundamental organizational dimensions of business processes, strategy and culture.

Last, digital transformation is a revolutionary and continuous process, rather than a project with a well-defined timeline. Digital technologies and the ever-changing external environment impose challenges

² We refer to culture as a collection of beliefs and attitudes in the workplace

for organizations that cannot be disregarded. Although the existing literature provides useful insight in conceptualizing digital transformation, an understanding of the mechanisms through which digital transformation transfigures an organization's processes, strategy, and culture, is still missing. In addition, digital transformation as organizational change has properties of IT-driven change, one of which is uncertainty. To this end, extant literature has scrutinized the concept of uncertainty within an organizational context (Kuechle et al., 2016; Packard et al., 2017), however, uncertainty in the form of a 'black swan' event (Cortez and Johnston, 2020) remains underexplored. A black swan event is an unpredictable occurrence with a low possibility to emerge, manifesting in a short period and having negative consequences (Cortez and Johnston, 2020). In the last few years, the external environment of all organizations has become even more challenging since the onset of the Covid-19 pandemic, as this crisis led to severe consequences on both the economic and social sphere (Giones et al., 2020; Cortez and Johnston, 2020; Alam, 2021). This type of crisis is one of many global challenges (e.g., climate change and natural disasters, financial recession, energy crisis, geopolitical turmoil etc.) that entail extreme uncertainty. Such events are disruptive for governments and organizations, who often rely on digital technologies to continue their operations. Therefore, it makes sense to explore digital transformation during extreme uncertainty to understand how to manage digital technology deployment and organizational transformation. With this conceptual background in mind, we contextualize the empirical setting of Higher Education in relation to digital technologies and digital transformation, to further explain how such a setting is deemed fitting for the purposes of our study.

2.3. Digital transformation in Higher Education

Although research on digital transformation is gaining momentum across multiple academic disciplines, there is still a paucity of research in the context of Higher Education. Within this context, digital transformation has been primarily discussed in tandem with individual technologies used to improve operational processes and the competitiveness of HEIs in a rapidly changing global market. For instance, Alam (2021) has explored whether online technology constitutes a sustainable solution for HEIs in developing countries to continue to function, and Alam and Parvin (2021) investigate the impact of online teaching delivery on students' academic success and job-readiness. These studies are particularly interesting as they capture the implications of technology on value creation paths amidst the uncertainty created by the pandemic, while Alam and Asimiran (2021) further such insight via proposing a policy framework that highlights how technological platforms should be used to support teaching delivery during emergencies. However, further research is still needed to explore the mechanisms intertwined with the transformation of multiple organizational dimensions.

There are also other scholars who focus on the implications of digital technologies on workforce competencies by exploring the digital prowess of educators (Núñez-Canal et al., 2022; de Obesso et al., 2023). Last, others focus on the use of digital technology to enhance teaching methods, for instance, Grijalvo et al. (2022) suggest that gamification techniques can enhance teaching quality. Despite the valuable insight these studies provide, they only partially capture digital transformation as widespread organizational change. Instead, they primarily explore the digitalization of certain business dimensions or functions. Therefore, there is a need for further research to explore how different technologies are implicated in the transfiguration of organizational dimensions beyond pedagogical practices or professional skills. In what follows, we present our methodological approach.

3. Methodology

3.1. Research design and case selection

We embarked on an intensive, qualitative case study to unveil how digital transformation as a form of organizational change deploys modifications to an organization's strategy, processes, and embedded culture during extreme uncertainty. The empirical setting for our case investigation is Akademia, a UK-based Institution in Higher Education. The case of Akademia was deliberately selected as a representative or typical case (Yin, 2013) that exemplifies a broad range of case organizations (Bryman, 2012). Akademia offers undergraduate and post-graduate programs to over 14,000 students among 10 different Schools (departments), as well as MBA and distance learning programs.

Over the last two decades, Akademia has increasingly been using digital technologies across functional silos and for a range of business processes such as teaching, research and administrative activities. There is evidence of digital transformation at Akademia since 2018, when the organization started adopting digital technologies, not only for operational efficiency and automation, but also to expand organizational operations by providing new digital offerings (e.g., distance learning programs). Digital transformation was still at an embryonic stage, even though the 'student-centric' and 'digitally advanced' pillars were core in its strategy and operational plan. At this point, we should note that Akademia engaged in modest digitalization efforts before the Covid-19 pandemic. Contrary to such efforts, we regard that digital transformation does not reflect the mere adoption of technology to support existing business processes, but a shift in almost every aspect of the organization. At the time of the study, Akademia's operations were severely disrupted by the Covid-19 pandemic, thus necessitating the profound modification of existing processes, strategy, and culture, for the continuation of its operations.

We perceive that our phenomenon can be opulently described by a single case study to understand the 'particular' (Langley et al., 2013), to answer the questions "what is going on here?," and "what is this a case of?" (Tsoukas, 2009, p.298). The single case method demands a trade-off between in-depth insights and generalizability. In other words, single case study methodology suffers from critiques in terms of the generalizability of the results but "making [this] inference to an insightful general case requires concrete and penetrating understanding of the particular" (Langley et al., 2013; p.8). Therefore, our study does not seek to generalize for Higher Education; rather, "the intent is to understand the deeper structure of the phenomenon, which it is believed can then be used to inform other settings" (Orlikowski and Baroudi, 1991, p.5) since useful conclusions can be drawn for organizations with similar characteristics (e.g., similar digital maturity, socioeconomic background, and subject to policy regulations).

In addition, the study of digital transformation at Akademia during the pandemic provides a valuable empirical setting for three main reasons. First, there is limited insight into how digital transformation manifests within this particular form of uncertainty. Second, data collection took place during the radical and rapid changes that the pandemic triggered. Therefore, we were able to investigate the immediate impact of extreme uncertainty on the organization and to capture any peculiarities on the transformational pace. This temporal convergence is able to reduce research participants' retrospective recall bias and thus helps enhance the trustworthiness and credibility of our findings (Lincoln and Guba, 1986). Last, Akademia's scale and operations (i.e., research, teaching and administrative processes) are similar to a plethora of both UK-based and non-UK based organizations.

3.2. Data collection and analysis

Based on the aim and scope of this study, we adopted qualitative methods for the collection of in-depth details for the phenomenon under investigation (Miles and Huberman, 1994). We explore the process of

digital transformation to unveil the day-to-day practices of those involved and possible explanations. Such practices are by nature socially constructed and require explanation based on subjective interpretation to provide a profound understanding of the underpinning mechanisms to manage transformation. Along these lines, data collection involved conducting semi-structured interviews and observations “to make better use of the knowledge-producing potentials of dialogues” (Brinkmann, 2014; p.437). We conducted 19 semi-structured interviews with actors, including academic faculty, senior managers, professional services staff and students between February and September 2021 (see also Appendix). Our semi-structured interviews aimed to understand interviewees' point of view rather than make inferences about behaviours. We purposefully selected interview participants in relation to their responsibilities and exposure to digital technologies, and we only interviewed participants who have been members of Akademia since pre-pandemic times and familiar with both analog and digital means of service delivery, to capture their perceptions of how digital transformation manifested. The interviews lasted, on average, 45 mins, were voice-recorded and transcribed. Two participants did not consent in recording the interview and, as a result, we kept notes during and after the interview. In addition to formal interviews, we also held several informal conversations with participants and engaged in numerous email exchanges.

A two-phase interview protocol was followed. First, we framed the main areas under investigation; digital technology, business processes (e.g., teaching, research, administration), culture and strategy. Then, we created an interview guide to ensure alignment between interview questions and research questions. An interview guide was used instead of structured questions as “the root of in-depth interviewing is an interest in understanding the lived experiences of other people and the meaning they make of that experience” (Seidman, 2013; p.9). Our questions aimed to capture multiple technologies, their transformational impact, how actors attempted to manage change and capitalize upon the benefits of

digital technology to continue different operations.

Also, it is important to mention that one of the authors was a member of Akademia throughout the duration of the study. Another member of the author team was also a faculty member at Akademia for a number of years, transitioned to a new University during the data collection stage yet maintained access and still delivered services to the University. This allowed the authors to foster quality interviews, as trust was already present (Rubin and Rubin, 2012). In this vein, the authors had deep, contextual knowledge of pre-existing digital technologies at the institution, as well as meaningful exposure to the level of adoption, implementation, and change of said technologies during the crisis event. However, to minimize subjectivity, we ensured the presence and involvement of the third author who was not related to Akademia. We also spent time observing meetings and diverse business processes. We concluded data collection when we noticed a point of diminishing returns, when nothing new was being added and data saturation was reached (Bowen, 2008).

The analysis of the empirical material (interview transcripts and observation notes) collected at Akademia centered on an abductive (Timmermans and Tavory, 2012; Alvesson and Kärreman, 2007) approach (Fig. 1). The abductive process allowed us to continuously “provide theoretical explanation of emerging empirical observations” (Begos and Antonopoulou, 2022, p.636) based on the iterative assessment of the literature and our data. Each analytical stage incorporates thick descriptions (Geertz, 1973) of different technologies and their transformational implications on the organization, to provide multiple reference points to future researchers for making judgements about the transferability of our findings to other empirical milieus (Lincoln and Guba, 1986). The analysis involved three steps (Fig. 1). First, we sought to identify and highlight extracts relating to digitalization, adoption and use of digital technologies. Then, we mapped digital technologies and the areas of their use to trace involved actors. This helped us draw connections between codes and pinpoint events and changes. In the

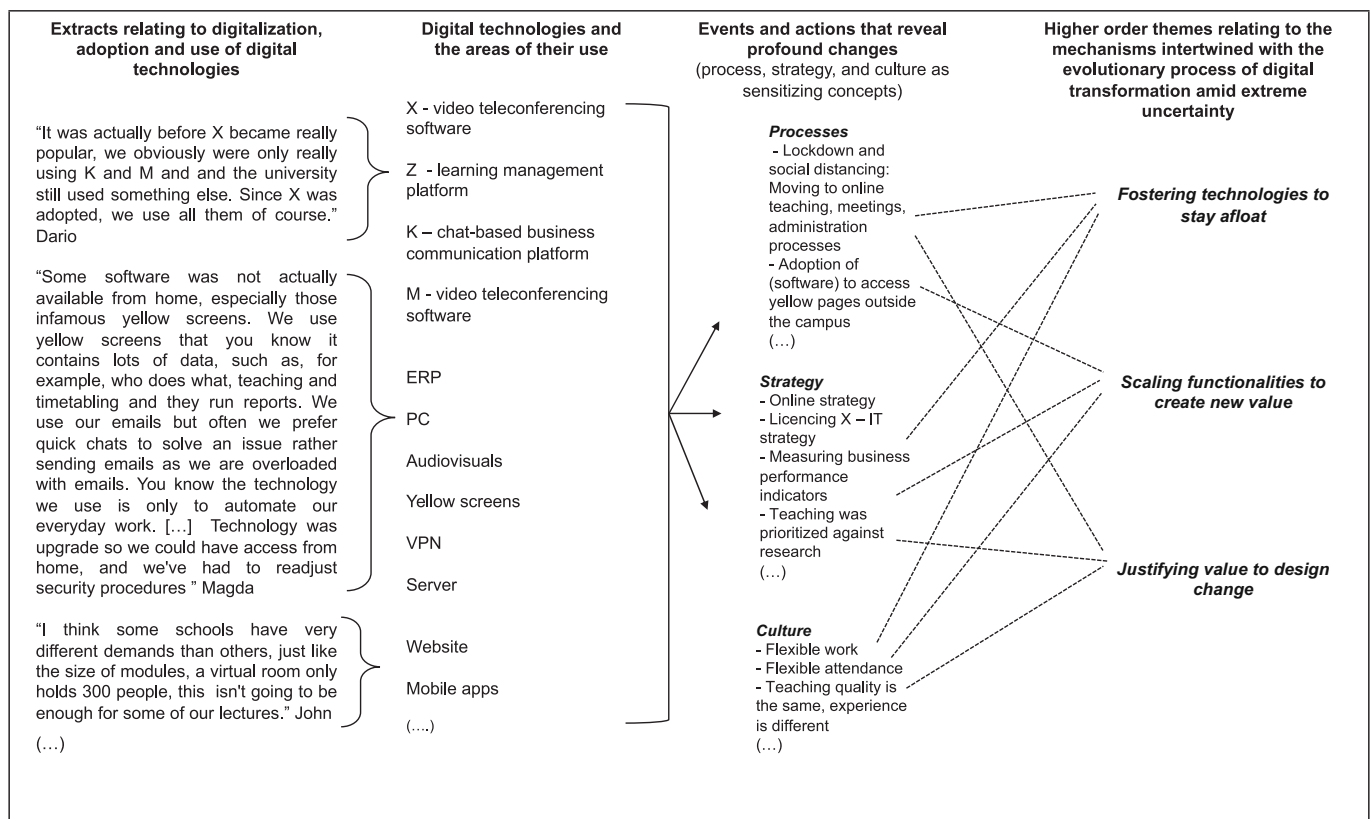


Fig. 1. Data analysis.

third step, we drew inspiration from IT-enabled organizational transformation literature (e.g., Scott-Morton, 1991; Davenport, 1993; Van de Ven and Poole, 1995; Orlikowski, 1996; Venkatraman, 1994) and used the notions of business process, strategy, and culture as sensitizing concepts (Nicolini, 2009; Walsham, 1995) to explore how the conjugation of digital technologies impacted the business infrastructure of our case setting. At this point, we abductively iterated between theoretical concepts and empirical material to generate an understanding of the mechanisms intertwined with the evolutionary process of digital transformation amid extreme uncertainty. We developed composite overviews, with three higher order themes emerging from the analysis: *fostering technologies to stay afloat*, *scaling functionalities to create new value*, and *justifying value to design change* (see Section 4.5). Last, we examined the relationship between these mechanisms to investigate whether they were conceptually and empirically distinctive. In what follows, we present the findings of our study.

4. Digital transformation amid extreme uncertainty

4.1. Digitalization and the onset of digital transformation

Over the last decade, a range of digital technologies supported and partially automated various organizational processes at Akademia. Among others, audiovisual technologies were in use to support teaching, an ERP software was used for back-office support such as managing student registrations and university premises, and digital library databases provided online access to resources such as books and journals. Magda, a Student Engagement Officer, explained how she was using technologies for different everyday work activities:

"We use yellow screens that contain lots of data, such as, for example, who does what and teaching and timetabling, and they run reports. We use our emails but often we prefer quick chats to solve an issue rather than sending emails as we are overloaded with emails. You know, the technology we use is only to automate our everyday work". [Magda – Student Engagement Officer]

Also, there were different digital resources for students available, such as online library databases for accessing published books, reports and datasets, and a digital learning management platform for accessing teaching materials and lecture recordings. In addition, most faculty members were using a range of digital technologies for research and teaching activities, such as research output repositories, timetabling and venue databases, lecture recording dashboards, research funding management platforms, and payroll, HR, and recruitment platforms, among others.

Therefore, before the pandemic, digital technology was mainly considered as a tool for everyday work practices to digitally mediate or automate business processes. The use of various digital technologies was predominantly mandated, their adoption was taken for granted and any technological changes or updates were creating distress, scepticism, and resistance. For example, many members of faculty were hesitant to learn how to use new platforms or software due to the time-consuming learning curve that would distract them from their research obligations. Also, the digital recording of lectures posed a major concern as faculty members were hesitant of losing ownership of their intellectual property and being monitored from senior management. For instance, Anna, a senior lecturer at Akademia, explained:

"We were using a different learning management system two years ago and when we changed, we had to learn how to use the new one, then the year after the adoption we had to redesign the module pages because of a template that was adopted. I have spent hours and it's very annoying. We create slides, design the module pages on the learning system and manually do the entry of attendances among many other things. It's very time consuming and if I had the option, I would not use any of these things". [Anna – Senior Lecturer]

Overall, during the pre-pandemic period, an explicit digital transformation strategy was not in place and, most importantly, these technologies were used in isolation, without profound implications for the business strategy of the organization. However, in recent years, it was apparent that strategic changes were necessary as other universities, seen as competitors, were constantly providing new digital offerings. There was an increasing demand for Akademia to introduce distance learning programs as other organizations had started exploiting digitalization benefits by providing online courses.

On 23rd March 2020, the UK government announced the first national lockdown as positive cases surged in the UK. However, shutting down Akademia's operations was not an option. This was a crucial moment, as critical and rapid decisions had to be made to move all physical activities and operations online. Intensive discussions on a senior management level took place, with the aim of rapidly reshaping the organization's business strategy, at least for the short term. We observed that the Director of IT services and the Head of Technology-enhanced Learning played an important role in these discussions, that aimed to discern how existing technologies and the adoption of new ones would help the organization stay afloat. Helen, a senior online distance learning coordinator provided an example of the interplay between scaling the use of existing technologies and adopting new ones, given the new conditions created by the pandemic:

"We had some of those technologies like B (cloud storage solution), but we were using it for administrative purposes and primarily to reduce the chaos with emails, but now we had to act fast to stay afloat. We had to think whether we could further use some of the existing platforms or whether we had to adopt new ones, how stable will those platforms be, how many students they could support simultaneously, the accessibility from other countries, because of course some of our students were not, and still are not all in the UK." [Helen – Senior Online Distance Learning Coordinator]

At this point, it is important to highlight that the conditions created by the pandemic played a crucial role in the transformation process. There was uncertainty about the lockdown's duration, the rules imposed by the government, and Akademia's ability to respond to digital needs that related to issues such as needed bandwidth, and student access to computers, cameras, and headsets. Although Akademia did not have budget constraints for investing into new technologies, its digital infrastructure was rudimentary. Very soon, all business processes would have to transform in a disruptive way to remain sustainable, and this was the starting point for fundamental changes. As John, Head of Department, highlighted, the pandemic had catalytic effects:

"The digital transformation process definitely accelerated, we had to stay afloat". [John – Head of Department]

In what follows, we present our findings of the transformational impact of digital technologies during the pandemic on business processes, culture, and strategy at Akademia.

4.2. Transfiguring business processes

At the beginning of the first lockdown, there was an immediate need to transform teaching delivery and administration processes. Most employees at Akademia were reasonably familiar with broad uses of digital technologies, but now, technology became a pre-requisite for business processes to merely exist. Kira, a lecturer, explained:

"Before, we were using technology to enhance student learning and experience, now without digital means there is no teaching, no knowledge creation, there is nothing" [Kira – Lecturer]

The dissemination of teaching material and recordings continued without concerns through the existing learning management platform, but teaching delivery had to change as it was a crucial process of high

importance. In the following quote, Dario, a professor at Akademia, outlines how he experienced the transformation:

“Last March, we went into lockdown and suddenly we moved everything online, we had had to get familiar with online teaching and X (video teleconferencing software) that I have never heard before the crisis. This had a big impact on how we approach teaching and on how we interact with colleagues. So, I've been using all this technology for a full year to deliver teaching and service, including some quite intensive teaching, such as two-day workshops, something which would have been completely unimaginable to me in the fairly recent past”. [Dario – Professor]

As Dario mentioned, a new digital technology was licensed to facilitate the continuation of teaching activities, everyday communication, and business meetings. Faculty, professional services staff, and students in a short period of time became familiar with its different functions and were increasingly participating in daily work activities. Anna, a faculty member, explained that she could participate in an increasing number of daily activities, stating:

“I can join a meeting while I am uploading my teaching material, organizing things on Z (learning management platform), or formatting my slides. I can swap meeting rooms easily”. [Anna - Senior Lecturer]

Also, students became rapidly familiar with this technology and developed an appreciation of the flexibility and multitasking efficiency that it offered, while also remaining cognisant of a potentially diluted learning experience. For example, Alex, a student, explained:

“You are more flexible. Last time I joined the class while I was cooking. Not effective to learn, but at least you can still join the class, you can still hear what they say, and you can still discuss. I feel I can discuss even while I'm cooking”. [Alex - 3rd year UG student]

In addition, we observed that such technological reconfigurations were not met with scepticism or resistance. Instead, users were quick to embrace technologies and change their practices, due to a common understanding that quick adjustments had to be made. For example, when the main video teleconferencing software reconfigured its code to improve security, members of Akademia started also using it for confidential meetings. New functionalities, such as live transcription and polling, were used to enhance the student learning experience. In other words, the reconfiguration of technology was rapidly embraced and led to changes in various business processes. For example, this is evident by Mirela, a student engagement officer, who describes how student services had to quickly and efficiently adjust to working from home and tackle issues on accessibility, data sharing and communication:

“When it came to that [lockdown], we had to begin working from home, it suddenly meant everything had to adapt very quickly, and there were aspects like access to systems that required access to VPN... because we went into lockdown, we did a project plan of transferring all of our files onto B (cloud storage solution), because we were going to be suddenly working from home, and that was going to be a huge change and it's quite hard to think about it because it happened so quickly. But for the first few weeks, a few months, just trying to get used to you know, using K (a chat-based business communication platform) as an office solution. So, we changed practices quite quickly and I think it was one of those situations where you had no other choice and now it's hard to think about life in a different way”. [Mirela – Student Engagement Officer]

In addition, such views reinforce the notion that technology was being scaled to further enhance the transformation of business processes. For example, users rapidly adjusted their practices when the learning management system was updated to support communication with students through messages, group discussions, the scheduling of online meetings and teaching sessions, as well as the submission and assessment of exam papers and assignments.

Meanwhile, the transformation of several business processes involved more than one digital technologies. For instance, a chat-based business communication platform that was initially used for internal communication between professional services staff, was eventually also used for teaching purposes. As Solo, a professor and Associate Dean at Akademia explained, some digital technologies were available before the pandemic, but their implementation was limited at the time due to a lack of necessity:

“There was a separate account for the video teleconferencing software that had been purchased and was set up specifically for distance learning. When we moved to online teaching, the decision was taken to bring X (video teleconferencing software) in and folded it into a much broader license and provision, so now it's part of the same provision, but it was existing in that one area previously. It was never picked up, used for teaching, it was used only for internal communication and co-ordination”. [Solo – Professor and Associate Dean]

Therefore, we observed that the adoption, combination and recombination of multiple technologies became of paramount importance in processes that experienced sudden and drastic changes. As such, most of Akademia's business processes were rapidly digitalized with no immediate need for embedding new technologies. However, senior management did not stop envisioning future changes and needs. For instance, a forthcoming hurdle to overcome was the transformation of physical exams to an online format. In order to retain various courses' accreditation eligibility from professional bodies, Akademia had to ensure that academic integrity would be protected. Therefore, senior management contemplated of adopting software that blocks access on webpages to mitigate collusion during online exams. However, there were technical constraints due to General Data Protection Regulations and for this reason, the adoption of such technology was rejected. However, they decided to use a conjugation of two different technologies for the exam process; the learning management and the student management platform, because this combination enabled the integration of plagiarism detection in the marking process. Student assessments would be submitted in the learning management platform, which fed into the student management platform that faculty was using to mark, check plagiarism scores and provide feedback, while administrative staff would produce reports and retrieve data for updating student records. Then, the student management platform fed marks and feedback back to the learning management platform, making them available to students.

In the next section, we present the transfiguration of Akademia's culture as part of the implications of digital transformation during the pandemic.

4.3. Transfiguring culture

We also observed that digital technologies had further implications on the overall culture that permeated the organization. In the beginning, there was uncertainty and confusion on how multiple technologies would be managed and affect business processes, and especially those that were not entirely digital before. In fact, at the early stages of the pandemic and during the first lockdown, those involved in Akademia and its business processes did not have any formal training on new technologies or how to digitalize traditional activities. All were overwhelmed by the decisions made and the technologies adopted overnight to rapidly transform business processes. At this stage, there was not much resistance to technology adoption, as the uncertainty imbued by the pandemic did not leave space for maneuvering.

Very soon, academic faculty realized the benefits of the use of different digital technologies. They were participating more on research seminars and meetings, were able to spend less time for teaching preparation compared to the beginning of the pandemic and were feeling more efficient as they could do multiple tasks at the same time. Also, students reacted well to the transition into online teaching, embracing

the changes. They considered that the continuation of their studies was crucial at a time of increasing unemployment rates and a challenging job market, thus they embraced the digitalization of teaching activities.

In addition, there were multiple digital technologies able to serve the same purpose for multiple groups of actors (e.g., faculty, professional services). However, actors relinquished their personal preferences and started using a conjugation of different available technologies to instigate collaborative working. For instance, Ann, a faculty member, explained that professional service staff were primarily using the teleconferencing software M to have meetings among themselves, faculty was using the teleconferencing software X, and communication between faculty and professional services was primarily through emails or X.

Within this context and as time went by, the transformational impact of digital technologies in culture was more evident. The teaching and research-led culture of the organization did not change, but the culture surrounding digital technologies and the way people interact with them was transfiguring. Actors' engagement with digital technologies was riddled with a steep learning curve, yet such hurdles were quickly overcome and gave way to a redefined workplace culture. This is evident in the following quote from Kira, a lecturer, who explained that:

"In the beginning I was very stressed, I had to adjust all my teaching material, adjust the exams and all require time, and this is against my teaching obligations. Later, everything was smoother, although the challenge for student engagement remains as many students have technical issues, do not switch on their cameras or use excuses for remaining silent. Also, I feel safe, and I don't have to commute. I collaborate in a big part in the same way. The only problem is the separation of business from personal time, but the conditions are very particular". [Kira – Lecturer]

When actors started feeling more familiar with the use of multiple technologies and receiving more assistance from the IT services of the organization, we observed that many were content with the increased efficiency and control over different processes that digital technologies afforded. Also, faculty and professional services staff, in an attempt to justify how they envision the future of their workplace, claimed that they wished to return to normality, mainly due to the absence of socializing in their workplace. For example, the following quote from an executive officer, Max, indicates this cultural change and highlights that digital technologies allowed for an increased sense of enjoyment:

"I realize the potential of technology and I kind of like my work more. I would say a balance of working from home and working in the office would be ideal". [Max – an executive officer]

In a similar vein, students realized the potential of digital means. Although many students' initial impression was that online teaching provided a lesser experience when compared to face-to-face interaction, student interviewees further argued that they would prefer a hybrid model of delivery due to the flexibility this offers, rather than the re-establishment of the traditional norms. Alan, a final-year undergraduate student claimed:

"In your home, the environment is not supporting you. It's the environment, when you were in the library, everybody studies, so you feel like you have classmates or friends who study also. [...] Also, if you're spending a postgraduate year, one of the main reasons for coming to University is obviously the network and to meet other people and get contacts. But I think the good thing is that you are more flexible. [...] Overall, I would like to have the choice. I mean, basically, if you're just paying £25,000 for an online course and a digital certificate is a lot, but it is enough to have the option". [Alan – Student]

In what follows, we discuss how Akademia's business strategy was transfigured as the crisis unfolded.

4.4. Transfiguring strategy

In the early stages of the pandemic, senior management considered that changes in the business strategy were necessary for the continuation of Akademia's operations amidst the uncertainty. Considerations for reshaping the organization's existing strategy succeeded other, UK-based Universities' strategy deliberations since for years, senior management was following a mimetic, risk-averse approach. According to John, Head of a Department:

"My sense is that they [decisions] are often made at the last minute, by looking at what other people are doing. I think it's very rare for Akademia to make a decision first and say okay we're going to do it this way, I think they [Akademia's senior management] are very risk-averse and scared, so they wait to see what everyone else is doing". [John – Head of Department]

According to senior management, the teaching-related aspect of Akademia's strategy was not reliant on price differentiation, especially among the common undergraduate degrees that most competing universities also offered. The main strategic pillars of their offering were the quality of the curriculum and the geographical location that attracted many British students for undergraduate studies, and both national and international students for postgraduate studies. Senior management did not intend to retain the online provision for existing programs once the crisis was resolved, and instead, they were planning a return to normality to reduce the loss of revenue from suspended on-campus activities and accommodation services.

Later, in September 2021, when the lockdown restrictions eased and a large part of the staff and student body in Akademia was vaccinated, senior management had to justify whether they would retain the changes in their business processes. During this period, there was still uncertainty regarding the potential of any future, government-mandated lockdowns. Furthermore, there were travelling restrictions in place that caused difficulties for international students to arrive to the UK, in addition to the government's guidelines on self-isolation upon infection. Within this context, we observed that there were many student requests that called for a return to traditional teaching delivery methods, deriving mainly from UK-based students. Such requests were contested by international students' desire to remain flexible and mitigate travel restrictions. Therefore, senior management decided that a hybrid model of service delivery was more appropriate, which was applied for both teaching and other business processes. At this point, teaching activities were both virtual and face-to-face, and professional services staff were on hybrid working arrangements.

During this transition, none of the adopted digital technologies were discarded. Instead, senior management were actively looking for better integration and optimization of their use. In addition, senior management and the University's Information Services Committee considered the adoption of more digital solutions, at the instigation of the IT Consultative Group. Factors such as modularity, scalability, and interoperability were highlighted during meetings that aimed to justify investments and how Akademia's digital infrastructure could expedite a continuous organizational transformation. Although senior management was planning to revert to traditional teaching methods, they had started envisioning brand-new offerings to capitalize upon the benefits of digital technologies. They considered developing new online programs with small courses that can be combined and re-combined to formulate degrees with high specialization and flexibility. The following quote from a Head of Department highlights that the transformation of strategy in Akademia was not entirely related to the University's core offering, but it had important ramifications for value creation and value creation paths.

"Over the past two years we've had all to work differently. [...] The University was strategically shifting from a general teaching support unit

to something entirely technology focused, basically, how do we bring tech into teaching. Now it [technology] is required to continue supporting and developing the needs of our evolving University. New services will be added with a focus on product improvement, agile working practices and enhanced student services.” [John – Head of Department]

Last, the transfiguration of Akademia's business strategy was also evident from the organization's updated strategic framework. This framework emphasizes the use of a combination of different technologies through targeted investments and strategic partnerships to enhance student learning, facilitate knowledge creation, aid educational administration, and strengthen Akademia's governance. In addition, this framework aims at a transfiguration of processes and the establishment of a digital infrastructure to support students' educational needs, academics' teaching activities and their pursuit of new knowledge, engagement and impact, and professional services in the delivery of their support activities.

4.5. The underpinning mechanisms of digital transformation in Akademia

Our analysis demonstrates that uncertainty acted as a catalyst for the transfiguration of business processes, culture, and strategy in Akademia. As digital transformation rapidly evolved, three mechanisms emerged, namely: fostering technologies to stay afloat, scaling functionalities to create new value, and justifying value to design change. In what follows, we present in detail these mechanisms and how they were entwined in managing transformation and capitalizing upon the benefits of digital technology.

4.5.1. Fostering technologies to stay afloat

First, we observed that the members of Akademia were constantly promoting the growth and development of digital technologies to continue operating under the conditions imposed by the pandemic. We refer to this mechanism as '*fostering technologies to stay afloat*' and argue that this is facilitated by digital technologies' open-ended and flexible affordances across business and functional boundaries. We observed that faculty, professional services staff, and students started using multiple, both new and pre-existing, technologies to transform existing business processes. For instance, a new video conferencing software was very quickly adopted, thus allowing the continuation of teaching delivery, student assessment, research activities and professional meetings, among others. However, the transformation of business processes was not entirely reliant on this one piece of software. In the case of teaching delivery, for instance, it was used in conjugation with other technologies such as the learning management and student management platforms. In addition, we observed that actors were facing difficulties in coping with the complexity of an ever-changing technological and organizational environment, but uncertainty eventually played a role in limiting actors' resistance in engaging with such technologies and changing their practices. Therefore, the view of digital technology as a necessary evil was progressively replaced by a culture that fostered a digital mindset, digital literacy and competencies. Also, this mechanism was apparent in the transfiguration of strategy. The first lockdown created an emergent need of figuring out a business strategy based on the conjugation of digital technologies for the continuation of Akademia's operations.

4.5.2. Scaling functionalities to create new value

We refer to '*scaling functionalities to create new value*' as the mechanism that it is facilitated by digital technologies' recombinant and reprogrammable nature. For example, before the pandemic, most of those involved in teaching processes were using the learning management platform to merely upload teaching material such as slides and documents. However, during the pandemic, the platform was also used to communicate with students through messages, facilitate group discussions, arrange meetings and online sessions, as well as to submit

exam papers and essays, among others. In addition, we observed that every time this mechanism was actualized, there were implications on different organizational dimensions. In the example above, it is apparent that the scaling of different technological functionalities entailed valuable implications for business processes and a newly found, digitally prone culture. Regarding culture, once faculty and professional services staff had realized the benefits of technologies on delivering teaching, research, and administrative tasks, they demonstrated resistance towards returning to their old practices after the pandemic. Last, the actualization of the scaling mechanism further underpinned changes in strategy. Senior management was contemplating the adoption of new technologies after exploiting various capabilities and possibilities of existing systems' interoperability and re-configuration.

4.5.3. Justifying value to design change

Lastly, we identify a third mechanism of significance, which we refer to as '*justifying value to design change*'. The members of Akademia were constantly attempting to justify the potential and value of digital technologies for the transfiguration of the organization to stay afloat amidst ever-changing circumstances, and design further changes to leverage the organization's core competencies. In this regard, our empirical analysis illustrates that senior management was in a constant discussion with employees and students to peruse how they experience and value the latest round of changes in the organization and how they envision the future of their education or workplace. Through such justifications, they aimed to design additional changes for existing processes, culture, and strategy. For instance, senior management was considering the launch of new taught programs that are available solely online and adopting flexible working arrangements that accommodated tele-working. Last, we argue that this is the mechanism that instantiates the multiple possible ways of creating future value and allows the design of strategic manoeuvres amidst uncertainty.

5. Discussion and implications

At the beginning of this paper, we conceptualized digital transformation as organizational change that is facilitated by digital technologies and can reshape every aspect of an organization to fully leverage its core competencies. We set out to understand the underpinning mechanisms of Akademia in managing transformation to capitalize upon the benefits of digital technology amidst uncertainty. In this section, drawing on our analysis of the empirical research presented, we address our research question.

Our analysis shows that in the case of Akademia, the pandemic prevented the organization from operating without undergoing fundamental changes to its business infrastructure. Amidst this uncertainty, there were external, uncontrollable, contextual conditions such as the rapid transformation of customer behavior and demand (e.g., increased demand for education given the increasing unemployment rates and a challenging job market), competition (e.g., other Universities' digital offerings) and continuous advancements in digital technologies. These acted as an input to Akademia's organizational transformation, and triggered changes in which several different digital technologies are involved (Fig. 2).

Our analysis showed that digital transformation in Akademia was underpinned by three mechanisms (Fig. 2), namely: fostering technologies to stay afloat, scaling functionalities to create new value, and justifying value to design change. The three mechanisms, when combined, enabled the organization to rapidly change its business infrastructure and eventually led to the transfiguration of its organizational culture, processes, and strategy. Last, such orchestration was not bound on a specific timeframe as it constantly evolved, owing to the ever-changing technology and uncertainty. Finally, we noticed that uncertainty catalyzed rather than hindered digital transformation in our case setting, accelerating the transfiguration of multiple organizational dimensions.

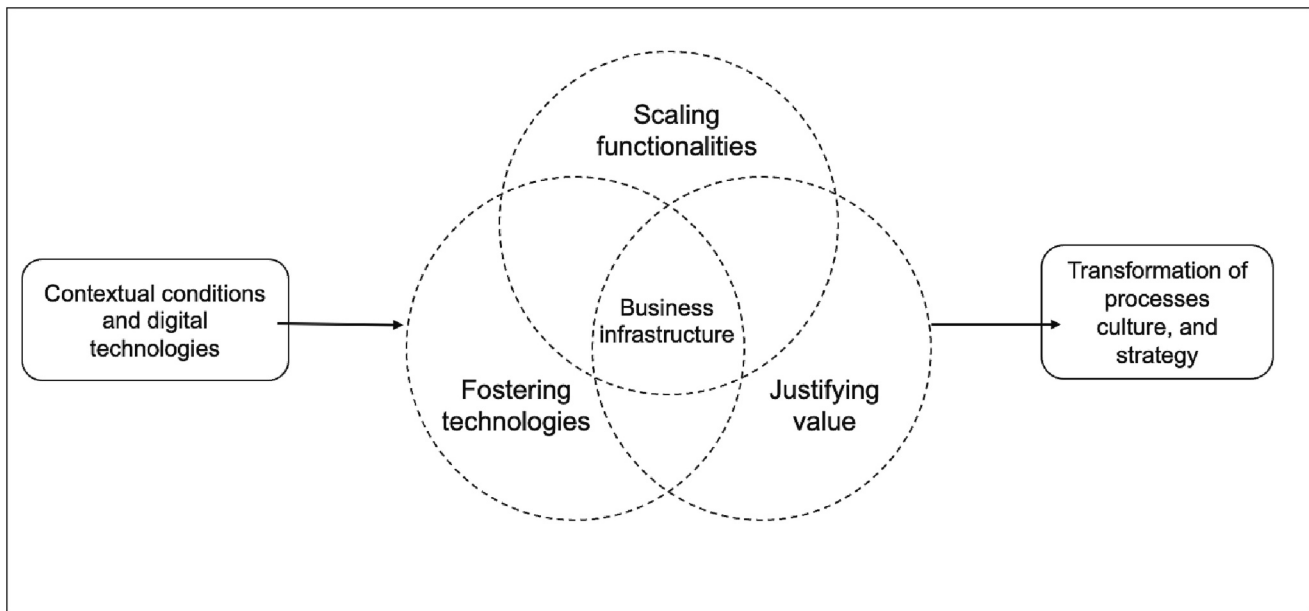


Fig. 2. The underpinning mechanisms of Digital Transformation at Akademia.

Our findings have significant implications for the literature on digital transformation and the wider literature on digitalization and organizational change. In what follows, we discuss the contributions of our findings for ongoing research and practice.

5.1. Implications for theory

Existing organizational change and IT-driven organizational transformation literature treats technology as a primarily back-office support function that has superficial or marginal effects (Baptista et al., 2020; Cecez-Kecmanovic et al., 1999; Bansler et al., 2000) instead of profound transformational implications in core business dimensions. Consistent with our conceptualization of digital transformation, organizational change at Akademia was facilitated by multiple digital technologies that reshaped its organizational aspects. Within this context, it is widely recognized that the recombinant and multi-layered nature of digital technologies (Yoo et al., 2010; Kallinikos et al., 2013; Tiwana et al., 2010) has disruptive potential that may enable firms undergo a fundamental transformation on multiple organizational dimensions. However, scholars have either focused on individual technologies or their implications on specific organizational dimensions (Karimi and Walter, 2015; Tiago and Verissimo, 2014; Sambamurthy et al., 2003; Sambamurthy and Zmud, 2000). Our view of digital transformation, as outlined earlier, provides a comprehensive attempt to understand the “holistic nature” (Hartl and Hess, 2017, p.3) of digital transformation by demonstrating how multiple technologies, when woven together, transfigure our case study site’s business processes, culture, and strategy.

In addition, our theorization also addresses the paucity of research in providing an understanding of the mechanisms in managing transformation and capitalizing upon the benefits of digital technologies. It is through actualizing the three mechanisms of fostering technologies to stay afloat, scaling functionalities to create new value, and justifying value to design change, that our case study site managed digital technology deployment and organizational transformation. Therefore, we articulate the dynamics by which digital transformation in our case study site deploys radical modifications of business processes, culture, and strategy in an “unfolding process(es) involving actors making choices interactively, in inescapably local conditions, by drawing on broader rules and resources” (Tsoukas and Chia, 2002, p.577). Also, our findings demonstrate that in Akademia, these mechanisms were interrelated in a dynamic rather than sequential way, and it is through these mechanisms

that the rapid and ongoing capitalizing of the benefits of digital technologies manifested.

Third, our findings also have implications in terms of the relationship between uncertainty and digital transformation. Although extant literature argues that uncertainty exists in organizational transformation (e.g., Bordia et al., 2004; Kuechle et al., 2016; Packard et al., 2017), it primarily focuses on the lack of information on competitors’ behavior, constant changes in customer preferences and demand, and the ever-changing nature of digital technologies. Our paper contributes to these studies by providing an in-depth understanding of digital transformation amidst uncertainty in the form of a ‘black swan’ event (Cortez and Johnston, 2020) that entails severe consequences on both the economic and social sphere (Giones et al., 2020; Cortez and Johnston, 2020; Alam, 2021). As shown in our empirical analysis and discussion so far, the uncertainty caused by the pandemic catalyzed digital transformation in our case setting. It supported radical and rapid changes in multiple organizational dimensions and triggered complex interactions between social and technical factors that were constitutively entangled (Orlikowski, 2000). Therefore, although extant literature has primarily dwelled on the negative connotations of the notion of uncertainty, emphasizes its harmful effects and organizations’ efforts to reduce it, we instead highlight the enabling power of uncertainty that cultivated fertile ground for digital transformation to manifest.

Last, our paper contributes to the digital transformation literature in the context of Higher Education. While extant research provides useful insight on the implications of digitalization in HE amidst uncertainty (Alam, 2021; Alam and Parvin, 2021; Alam and Asimiran, 2021), we provide a comprehensive understanding of how multiple technologies underpin digital transformation and can transfigure business processes, strategy and culture in a HE Institution. Our findings show that, despite the uncertainty caused by the pandemic, Akademia was able to continue its operations by conjugating multiple technologies and fundamentally changing its overall business infrastructure. Therefore, in our case study site, we noticed that no individual technology, department, or organizational champion could lead all the changes required for digital transformation. On the contrary, we propose that, in empirical settings similar to ours, a fundamental shift is needed towards a more collaborative, participative mindset and a shared sense of mission across all business functions for achieving digital transformation.

5.2. Implications for practice

The insight gained from our study also has implications for practitioners who face the challenge of managing digital transformation in highly dynamic, complex, and uncertain conditions. According to the [World Health Organization \(2020\)](#), the Covid-19 pandemic may be the latest worldwide health crisis but not the last. It is one of many global challenges and crises ([Giones et al., 2020](#); [Cortez and Johnston, 2020](#); [Alam, 2021](#)) that imbue uncertainty and have severe financial, social, and organizational consequences, such as climate change and the energy crisis, natural disasters, financial recessions, and geopolitical conflicts. This paper serves as a foundation for informing our understanding, as well as future studies, of digital transformation highlighting possible ways for organizations to continue their operations by capitalizing upon the benefits of digital technology in times of crises.

Finally, in our paper, uncertainty accelerated rather than obstructed digital transformation. Our findings highlight three potential mechanisms that indicate how organizations with similar characteristics (e.g., similar digital maturity, socioeconomic background, and subject to policy regulations) can deal with uncertainty via exploring the spectrum of functionalities within existing digital technologies and exploiting their inherent re-programmable and reconfigurable nature. Therefore, when the complete disruption of an organization's operations is not possible, our paper suggests that digital transformation, via the conjugation of multiple digital technologies, may help knowledge-intensive organizations avoid drastic measures (e.g., staff dismissal, selling of assets) to mitigate uncertainty, loss of revenue, and eventually stay afloat.

5.3. Limitations and future research

Our research also comes with limitations. First, the study builds on a single case study, where the type of insights generated should be seen as causal tendencies rather than certainties. Therefore, the findings reported in the paper are constrained to a degree by this choice. However, this limitation of our typical, single-case setting cannot be avoided in an explanatory investigation of a nascent area such as the one studied here. Second, although our findings identify three mechanisms through which our case study organization accelerated its digital transformation amid uncertainty, we do not argue that our identified mechanisms are

exhaustive, all-encompassing, or applicable to any setting. Our in-depth investigation focuses on a case study site with specific characteristics in terms of its internal and external environment (e.g., its digital infrastructure, the UK Higher Education system etc.). Therefore, the insights generated do not aim to generalize for every public or private organization, or for organizations based in developing nations. Future work, such as comparative studies that embark on cross-examination opportunities, may explore possible variations in how digital transformation is instantiated in different settings and clarify whether our identified mechanisms underpinning digital transformation may be different or applicable in other organizations.

6. Conclusion

At the beginning of this article, we propose a view of digital transformation as widespread organizational change that is realized by the adoption of multiple digital technologies and underpins modifications across multiple organizational dimensions to capitalize upon the offerings of digital technologies. The analysis of our empirical material unveils three mechanisms (fostering technologies to stay afloat, scaling functionalities to create new value, and justifying value to design change) with which a UK-based organization in HE engages upon to manage digital transformation amidst extreme uncertainty caused by the Covid-19 pandemic.

The research contributes to previous organizational change and digital transformation literature by capturing the conjugation of digital technologies and the transfiguration of business processes, strategy, and culture, and by articulating the mechanisms through which our case organization managed such transformation. Finally, our findings contribute to previous IT-driven organizational change and uncertainty studies by demonstrating that extreme uncertainty can act as a catalyst for digital transformation.

Declaration of competing interest

None.

Data availability

The data that has been used is confidential.

Appendix A. Table of interviewees

#	Duration approx.	Pseudonym	Organizational role
1	00:38	Max	Executive Officer
2	00:40	Anna	Senior Lecturer
3	00:48	Helen	Senior Online Distance Learning Coordinator
4	00:53	Kira	Lecturer
5	00:52	Magda	Student Engagement Officer (International Student Support)
6	00:57	Dario	Professor
7	00:53	Tony	Head of Technology Enhanced Learning
8	00:53	Miles	Associate Dean for Education and Students
9	00:53	John	Head of Department
10	00:58	Solo	Professor and Associate Dean
11	00:54	Mirela	Student engagement Officer
12	00:39	Alex	3rd year UG student
13	00:56	Toby	2nd year UG student
14	00:48	Kayle	1st year PG student (2 years) – (UG also at Akademia)
15	00:54	Joe	2nd year UG student
16	00:52	Sasha	3rd year UG student
17	00:33	Alan	3rd year UG student
18	00:42	Robert	PG student
19	00:37	Sonia	3rd year UG student

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