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Help those helping others - the role of universities in facilitating digitalisation and virtualisation in non-profit organisations

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Abstract
In this paper we explore the role of universities in supporting the adoption of digitalisation and virtualisation technologies in non-profit organisations, through the development of strategic partnerships. Despite the increasing interest in technology transfer and adoption in various industries, there is currently very limited research on the opportunities and challenges digital technologies can create for organisations supporting societal change. By adopting a Service-Dominant logic (S-D logic) lens, we explore technology transfer as an interaction between organisations, and we use in-depth interviews with 13 non-profit organisations based in the UK, to understand better their current level of technology adoption and the challenges they face in the technology adoption process. We then explore how universities, as strategic partners, can act as intermediaries, supporting more meaningful technology adoption by non-profits and their stakeholders. We conclude that universities need to move beyond their focus on the dyadic relationships with industry and consider themselves as facilitators of interactions and value co-creation within the wider technology transfer ecosystem, as they need to consider several diverse stakeholders if they are to support the digitisation and virtualisation in non-profits.

Keywords Digitalisation · Technology transfer · Non-profits · Service-dominant logic · Strategic partnerships · University-industry collaborations

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1 Introduction

The emergence of digitalisation and virtualisation has become crucial for businesses in the modern world (Roy, 2023), and have greatly aided in producing previously unheard-of value for their clients (Jabbar & Dani, 2020). Digitalisation and virtualisation are two interconnected concepts aimed at enhancing efficiency and accelerating processes. According to Rijswijk et al. (2023) digitalisation is defined as a disruptive socio-technical process, such as adoption of a digital platform or process, that results not only in technological gains but also in social, institutional, and economic transformations. Parallel to this, virtualisation is defined as the use of cloud-based technologies and the software-as-a-service business model (Tso et al., 2016), to develop centralised, online solutions and provide new digital products and services. Digitalisation and virtualisation can offer several benefits to organisations, such as faster access to large data bases (Jabbar et al., 2020), new organisational value propositions (Roy, 2023), increased customer trust (Devine et al., 2021) and optimised communication channels (Nadkarni & Prügl, 2021).

In this study, we argue that digitalisation and virtualisation provide ample opportunity for organisations in the non-profit sector (e.g., charities or social businesses), to improve their operations and efficiency (Apostolidis et al., 2022b; Devine et al., 2021). Although several studies have looked at the adoption and impact of the digitalisation and virtualisation processes in public and for-profit organisations (see Bresciani et al., 2021a; Caputo et al., 2021; Kraus et al., 2019), specifically for non-profit organisations the digitalisation and virtualisation processes are poorly understood (Cipriano & Za, 2023; Brink et al., 2020). Due to their distinctive characteristics, such as prioritisation of non-financial and social outcomes, unique value-creation structures, limited technological resources and competencies, increased bureaucracy and slowness in decision making, digitalisation and virtualisation efforts may present additional opportunities and challenges for non-profit organisations (Cipriano & Za, 2023; Brink et al., 2020; Jong & Ganzaroli, 2023). More specifically, research conducted by Charity Digital (2023) suggests that 58% of UK charities admit to lacking a digital strategy, while the report highlights that charities need to develop their digital skills to be able to take advantage of the opportunities of digital technologies the same way as for-profit businesses. Furthermore, many charities consider digitalisation and virtualisation processes very demanding and unaffordable, especially amongst smaller organisations, as a lot of resources, knowledge, skills and training are needed (Cipriano & Za, 2023). Based on the above, charities may require additional support to identify and understand the various opportunities and challenges that digitalisation and virtualisation applications can create and how they can be meaningfully adopted to benefit their organisations.

This lack of knowledge, resources, competencies and overall digital strategy opens the door for institutions who have the skills, knowledge and resources to support the digitalisation and virtualisation efforts of nonprofits. To that effect, studies highlight that non-profit organisations should explore collaboration opportunities with other stakeholders in the wider ecosystem (i.e., beyond their members, employees and beneficiaries) that can support them in their efforts to adopt digital solutions (Cipriano & Za, 2023; Jong & Ganzaroli, 2023). Research has shown that university-industry collaborations (henceforth UICs) can become an effective approach for knowledge creation, technology transfer, digitalisation and diffusion of new technologies between universities and firms (Atta Owusu et al. 2021; Siachou et al., 2021). It is also regarded as a source for innovation, with a large share of

R&D-intensive firms acknowledging universities among their most important sources of new knowledge (Ardito et al., 2019; Rosli & Rossi, 2016; Huggins et al., 2020). Hence, it is not surprising to find that numerous studies have investigated the factors that affect the success of UICs (e.g., Thune, 2011; Ferraris et al., 2020; Ardito et al., 2019; O'Dwyer et al., 2023).

Based on the above, UICs can contribute significantly to the digitalisation and virtualisation efforts of nonprofits, for instance by enabling and supporting the transfer of digital technologies and solutions from profit to nonprofit organisations. To date however, there is a lack of interaction and collaboration between universities and the non-profit sector (Al-Tabbaa & Ankrah, 2019; Al-Tabbaa et al., 2014; Freitas et al., 2013). Therefore, scholars argue that further research is required, specifically on technology transfer and collaborations between the universities and non-profit organisations (Olarewaju et al., 2023; Berg et al., 2020; Abreu & Grinevich, 2013). In our study, we contribute to this under-researched area as we explore the role that universities can play in the technology transfer and adoption of digital solutions by charities.

More specifically, our aim is to contribute to this area of research by exploring the potential of universities to act as an intermediary between non-profit organisations, for-profit organisations and other stakeholders in their efforts towards digitalisation and virtualisation. Employing S-D logic as our theoretical lens, we explore technology transfer and digitalisation as value co-created in the interactions between nonprofits and for-profit organisations (e.g., technology businesses), and we develop an in-depth understanding of the factors that can affect these stakeholder interactions. We also elucidate how universities can support value co-creation and technology transfer by enabling and facilitating the interactions between two seemingly diverse and unique stakeholders.

Our paper makes various contributions to existing knowledge. First, from a theoretical point of view, it highlights how goal misalignment, digital imbalances and lack of trust between stakeholders in a technology transfer ecosystem may not only inhibit technology adoption but lead to the diminishment of the value created and the wellbeing of the stakeholders involved (i.e. value co-destruction). Furthermore, our study highlights the role that external stakeholders (in our study universities) could play as an enabler of interactions, technology transfer and value co-creation. The study also extends our existing knowledge on the digitalisation/virtualisation processes of nonprofits, highlighting the barriers and challenges that these organisations face when trying to adopt digital solutions. Practically, by looking at the role of UICs beyond the for-profit sector (Gazley & Guo, 2020), we highlight the critical role universities play in acting as a facilitator for digitalisation and virtualisation, e.g., through resource sharing and knowledge transfer (Albats et al., 2022). Our findings show that universities need to broaden their scope beyond the dyadic relationships with businesses (O'Dwyer et al., 2023) and explore their role as knowledge and technology 'brokers' (Atiase et al., 2020) that can support value co-creation for organisations.

The remaining sections of our paper are structured as follows. Section two provides detailed discussion on relevant literature on digitalisation and virtualisation and UICs and introduces S-D logic and value co-creation/co-destruction as the theoretical lens of this study. Section three offers an overview of the methodology which underpins this study and an initial review of the data. Section four presents our findings and subsequent discussion, while the final section (section five) outlines our contribution.

2 Literature review

2.1 Digitalisation and virtualisation for profit organisations

Digitalisation refers to the application of digital technologies that brings changes to businesses and markets, usually following (the similar but distinct step of) digitisation which is related to the conversion of information and processes into a digital format (Ritter & Pedersen, 2020). Conversely, virtualisation provides flexibility in creating virtual artefacts of physical items, for example servers, meeting spaces and computer labs to support their operations and improve their efficiency (Limburg et al., 2017). Digitalisation and virtualisation can lead to several opportunities for businesses, such as enhancing operational efficiency, reducing costs, minimising risk factors, and increasing business' output (Björkdahl, 2020; Martín-Peña et al., 2019).

In addition to the general opportunities for businesses created by digitalisation and virtualisation, the extant literature extensively explores the potential of digitalisation and virtualisation to facilitate interorganizational collaborations, and the development of digital capabilities, and digital value propositions (Adomako & Nguyen, 2023; Ritter & Pedersen, 2020). Furthermore, researchers argue that increasing digitalisation can offer opportunities for organisations to reduce their social and environmental impact (Agrawal et al., 2022), while shaping a more equitable and inclusive 'playing field' for organisations (Butticè & Vismara, 2022). For many organisations digitalisation and virtualisation have led to multiple benefits including access to new markets, increased innovation, access to investors and funding, environmental enhancement and improvements in employee and customer satisfaction by supporting interactions and the product development (e.g., Ritter & Pedersen, 2020; Butticè & Vismara, 2022; Pfister & Lehmann, 2023). Finally, digitalisation can offer significant opportunities for resource mobilisation (i.e., securing and utilising additional resources to achieve their goals), which can play a pivotal role considering the resource constraints commonly found in organisations during times of economic stagnation or recession (Xiao & Beckmann, 2024). For instance, Inceoglu et al. (2024) highlight the connection between digitalisation and resource mobilisation, suggesting that digitalisation can considerably alter how organisations source and assemble resources. A clear example of this is when firms utilise digital platforms to mobilise financial resources from potential investors (Vismara, 2022) or recruit new members of staff (Tambe et al., 2019).

Conversely, although many organisations (including large businesses and industry leaders) spend significant sums to adopt new technologies and develop strategies for digitalisation and virtualisation (Longoni & Cian, 2022), smaller organisations (including social businesses and nonprofits) tend to be reluctant to adopt digital technologies due to uncertain outcomes, time constraints, high investment costs and risk of investing in the wrong emerging technologies (Cipriano & Za, 2023; Brink et al., 2020; Jong & Ganzaroli, 2023; Müller et al., 2018). As such, recent studies have highlighted the need for further research into the digitalisation and virtualisation processes of non-profit organisations and the factors that affect technology adoption by nonprofits (e.g., Alshawaaf & Lee, 2021; Olarewaju et al., 2023; Berg et al., 2020).

2.2 Digitalisation and virtualisation for non-profit organisations

While profit oriented companies have developed and adopted a plethora of digitalisation and virtualisation solutions to improve their efficiency, services and bottom lines, in the context of the non-profit sector digitalisation and virtualisation are still nascent. Nevertheless, studies suggest that the potential benefits for non-profits adopting digitisation and virtualisation strategies are significant, as they can employ technology for the provision of better and more efficient services ensuring accessibility, ease of use as well as extending their reach to more beneficiaries (Yu Chung Wang & Wang, 2020). Preliminary studies in this area have explored the utilisation of Industry 4.0 technologies, including AI, IoT, and blockchain, as tools to support the mission and vision of organisations aiming to support societal change and benefit local communities. For example, recent research has highlighted the potential use of social media for outreach and communication (Vrontis et al., 2022), adoption of cloud-based systems for data storage (Jabbar et al., 2020), or leveraging smart contracts for social businesses (Devine et al., 2021). In the specific context of nonprofits, research has highlighted the use of digitisation and virtualisation tools to create digital revenue streams (Alshawaaf & Lee, 2021) to attract volunteers and employees (Chui & Chan, 2019) and to track charity donations via blockchain (Avdoshin & Pesotskaya, 2021).

Despite the many opportunities these technologies offer, the level of digitalisation and virtualisation in nonprofits remains relatively low particularly due to their typically constrained budgets (Rocha & Audretsch, 2022). For example, substantial costs, time and resources are involved in the digitisation of analogue data, preceding the digitalisation and virtualisation processes (Qin & Jiang, 2019). In addition to costs and time, additional resources and effort are crucial in training staff, employees and volunteers, to meaningfully adopt and use the new technologies (e.g., Cipriano & Za, 2023). The shift to new systems and infrastructures will also inadvertently erect technological barriers for several stakeholders of non-profit organisations (such as volunteers, beneficiaries or members), particularly those who may find accessing such technology challenging or costly (Apostolidis et al., 2021; Batra & Keller, 2016). This highlights the significance of the digital divide in the digitalisation and virtualisation efforts of non-profit organisations. Not all interested stakeholders of non-profit organisations (e.g., minorities, abused individuals, financially vulnerable adults) possess the capabilities and access to the technology needed to use many of the digital technologies available (Apostolidis et al., 2021; van Deursen & van Dijk, 2015; Rijswijk et al., 2023).

Technology transfer can play an important role in this context, where limited resources and absorptive capabilities can affect the access, adoption and use of digital technologies (Hilkenmeier et al., 2021). This, however, highlights the need to identify and collaborate with the right partners, that will enable technology transfer and result in a range of desirable outcomes for all partners involved (Simms & Frishammar, 2024). Several studies have suggested that collaborations and strategic alliances between non-profit and for-profit organisations can support technology adoption and benefit both organisations involved in the cooperation agreement. For instance, through the collaboration with for-profit organisations, nonprofits can adopt technologies to support their operations and develop innovative solutions to solve social problems, which can also improve the reputation and corporate image of the for-profit organisation (e.g., Talavera & Sanchis, 2020). Furthermore, non-profit/for-profit collaborations can improve the technology access and use of the members

and beneficiaries of the nonprofits, e.g., through refurbishment, reuse and distribution of digital technology, which can help non-profits overcome the digital divide in the communities they operate within (e.g., Gonzales & Yan, 2020). However, partnerships between actors with different business models can create conflict and negatively affect technology adoption and diminish the wellbeing of the stakeholders involved and the value of the services they strive to offer (Nahrkhalaji et al., 2018).

This creates unique challenges for non-profit organisations that require careful consideration and planning. Nevertheless, research in this area is still very sparse and limited (Limburg et al., 2017). In this study, we adopt a S-D logic lens to explore the factors that can affect the aforementioned collaborations between non- and for-profit organisations, and the role that universities can play in supporting these collaborations, thus enabling a more sustainable and efficient integration of digitalisation and virtualisation solutions in non-profit organisations (Baek & Yoon, 2022).

2.3 Universities as facilitators of digitalisation and virtualisation

In the technology transfer literature, several studies have explored the role of universities, as nonprofits, and their involvement in technology transfer from non-profit to for-profit organisations and the industry (Bamford et al., 2023; Jefferson et al., 2017; Hayter & Rooksby, 2016). The model of universities, industries, and government working together, often referred to as the "triple helix" for innovation (Ranga & Etzkowitz, 2013), highlights the potential for such collaborative approaches in technology adoption, not only for profit, but also to tackle societal problems. To date, however, there has been limited research exploring the role of universities as facilitators in the technology transfer process from the for-profit to non-profit organisations and charities.

The role of the universities is evolving from a purely knowledge source to a burgeoning transformative leader in society (Audretsch, 2014), providing the opportunity for a shift in mission of universities, encouraging their collaboration with various stakeholders that can support economic and societal impact (Brown-Luthango, 2013; Guerrero et al., 2015; Fini et al., 2018). Most collaborations are normally agreed between universities and industry organisations, and therefore they are commonly known as UICs (Bamford et al., 2023; O'Dwyer et al., 2022). UICs can take varied forms, such as knowledge transfer partnerships, high tech clusters, technology parks and collaboration with industry partners offering access to skills and knowledge (Oliver, 2022; Sandoval Hamón et al., 2022; Toma et al., 2016; O'Dwyer et al., 2022).

The body of literature on UIC has produced numerous findings to reflect on the complex and multifaceted phenomenon of collaborations between industry and universities (Bamford et al., 2023). Trust has been well documented in the literature as an important factor for innovation in UICs (Giaretta, 2014; Oliver et al., 2020). The importance of trust is also noted in relation to interpersonal trust (among individuals), and inter-organizational trust (among leaders on behalf of the organisations), in negotiation and collaboration processes (Oliver et al., 2020). Additionally, the strength of ties between partners influences the decision for time, knowledge and resources commitment (Arza & Carattoli, 2017).

The extant literature also explores the barriers that affect collaboration between universities and industry (e.g., Soh & Subramanian, 2014; Bstieler et al., 2017). For example, from the industry's perspective, there is a strong lack of trust, knowledge leakage and a reluc-

tance for information sharing with university partners (O'Dwyer et al., 2022). On the other hand, universities may face difficulties in prioritising and negotiating tasks or combining academic knowledge with tacit knowledge from industry (Alexander et al., 2020; Bellini et al., 2019). Therefore, supporting meaningful interactions between university and industry, e.g., by developing trust, incentivising collaborations and aligning organisational culture, has been noted as pivotal in the success of UICs (Bjerregaard, 2009). The following table (Table 1) summarises a range of definitions of UIC success adopted in the literature, and the corresponding indicators used to measure the success.

In addition to the above, in a comprehensive review of technology transfer literature, Bozeman et al. (2015) reveal an increasing focus on transfer of technology from university to industry, highlighting a need for more research, focused on technology transfer which can result not only in economic but also public and social benefits.

Nevertheless, while there is a significant amount of research on UIC advocating the strong links between universities and industry, there is still a dearth of research on the collaboration between universities and non-profit organisations. We also find that research on UICs supporting digitalisation/virtualisation is limited. The scope and outputs of UICs related to digitalisation and virtualisation are varied and the structure of the collaborations are in some cases quite complex. Therefore, Oliver (2022) states that an emphasis should be placed on holistic ecosystems for innovative collaborations between universities and industries, while Sandoval Hamón et al. (2022) highlight the importance of meaningful interactions between universities and industries creating high-tech clusters supporting technology transfer, knowledge spillover and innovation.

From the literature review above, universities have the potential to act as a facilitator in the non-profit organisation ecosystem supporting interactions with other stakeholders,

Table 1 Definitions and indicators of UIC success

Definition of success	Indicators of success
The UIC has generated positive impact on various stakeholders	• New projects, number of solutions concepts, number of innovations, human capital indicators (Perkmann et al., 2011). • Interviewees' opinions about market, energy, environmental, social benefits of the UIC (Kingsley et al., 1996; Roncancio-Marin et al., 2022). • Project impacts in terms of innovation output, market success, economic development, public reward, opportunity cost, scientific and technical human capital; quantitative or qualitative measurements (Bozeman, 2000; Kobarg et al., 2018).
The UIC has led to the production of required outcomes	• Whether the technology had or had not been finally adopted (used) or commercialised by the company, measured through survey questions (Bernardos Barbolla & Casar Corredera, 2009). • Short term outcomes (number of licences, requests for help, transfer budgets) and long-term outcomes (cost savings, new commercial sales, new products, royalties, user satisfaction, etc.) (Spann et al., 1995; Rossi et al., 2022) • Long term development of professional competences (Stock & Tatikonda, 2000). • Scientific and technological outcomes, level of absorption, use and commercialisation of knowledge developed in the project (Bekkers & Freitas, 2008) • The UIC has led to new business opportunities (Rosli et al., 2018) and societal impact (Fernandes & O'Sullivan, 2023).
Participants are satisfied with the UIC	• Extent to which the interviewees consider the project to have been successful (Barnes et al., 2002; Bekkers & Bodas Freitas, 2008; Mora-Valentin et al., 2004; Shrum et al., 2001; Stock & Tatikonda, 2000).
The UIC has been maintained over time	• Whether the partnership has continued over time (Bouty, 2000; Cyert & Goodman, 1997; Geisler, 2001; Mora-Valentin et al., 2004; Santoro, 2000). • Extent to which new linkages are formed out of the collaboration; probability of forming new links (Giuliani & Arza, 2012).

enabling the digitalisation and virtualisation processes. In this study we explore this role of universities by adopting a S-D logic lens to explore the factors that may affect the interactions between various stakeholders in the digital transformation process of nonprofits.

2.4 Theoretical approach

Several researchers have used S-D logic to explain the important role of different stakeholders in the value creation process, particularly within the adoption and use of new technologies (e.g., Apostolidis et al., 2021; Lei et al., 2019; Roy et al., 2019). In S-D logic, value is not created by one stakeholder and delivered to others, but value is determined and created during the interactions between stakeholders, and therefore "intangibility, exchange processes, and relationships are central" (Vargo & Lusch, 2004, p. 2). From this perspective, although for-profit organisations (e.g., technology developers) can offer value propositions through their designs and technology products, the users (e.g., non-profits, volunteers, members, beneficiaries) decide whether and how to use these technologies, which results in 'value-in-use' (Akaka & Vargo, 2014; Vargo & Lusch, 2008).

Studies suggest that value co-creation and resource integration are increasingly relevant within the digital transformation for societal change, particularly because involving vulnerable users and non-profit organisations as value co-creators may contribute to the development of better services and the alleviation of challenges such as poverty and discrimination in the longer term (Apostolidis et al., 2021). This view also highlights the relevance of the 'value-in-use' perspective as, for charities to meaningfully engage with the digitalisation and virtualisation process, their stakeholders (beneficiaries, volunteers, employees) need to be able to engage with the technology and capitalise on its value propositions. For example, while value propositions are embedded within digitization and virtualisation technologies (e.g., facilitating interactions between members/organisations to support their wellbeing), the way these technologies are used determines whether this value is materialised.

This highlights the need to move the focus of digitalisation and virtualisation from being purely a matter of resources and/or capabilities, to a view that considers the digitalisation process as a series of interactions with stakeholders, aiming to create value for all parties involved. This is extremely important, as problems in these relationships (e.g., conflict, lack of motivation, goal misalignment or power imbalances) can lead to different perceptions of the value which the adoption of different technologies can offer, strongly influencing resource integration and the value co-creation process (D'Andrea et al., 2019; Echeverri & Skålén, 2021; Lei et al., 2019). Conversely, problematic relationships can create tensions between participating stakeholders which diminish the wellbeing of one or more stakeholders. This can lead to the destruction (instead of creation) of value, as the interactions diminish at least one of the actor's wellbeing (Plé & Cáceres, 2010). Scholars name this 'value co-destruction', attributing it to factors such as system failures, stakeholder conflict, lack of competency, power imbalances, and (intentional or unintentional) misuse of resources (Echeverri & Skålén, 2021; Findsrud et al., 2018; Groening et al., 2018; Plé & Cáceres, 2010). For instance, limited technological literacy and skills may hinder the adoption of technology by non-profits, negatively impacting the value-in-use that technology can offer, which highlights the significance of the digital divide in the digitalisation and virtualisation processes. Therefore, to explore how the interactions between for-profit and non-profit organisations affect technology transfer and the digitalisation and virtualisation efforts, as well as the role

that universities can play as facilitators in these interactions, both value co-creative and co-destructive interactions must be considered.

3 Methodology

To achieve the research aim, the authors investigated the connections between universities, non-profits, and for-profit organisations in the UK to help identify the nature of their interactions and how technology transfer takes place. As the vast majority of studies on technology transfer are traditionally industry-focused, this research utilised semi-structured interviews to explore in depth technology transfer from the perspective of nonprofits and the role that universities can play in facilitating this process. Thus, we have adopted a qualitative approach to provide in-depth insights into social and organisational realities (Easterby-Smith et al. 2015) and the participants' meanings, and interpretations of the phenomena (Kvale, 1996; Ritchie et al., 2003).

The authors interviewed 13 senior figures in 2023 within various non-profits (charities, non-profit organisations, and community groups) to uncover the specific dynamics, challenges, and opportunities that shape their approach to technology and their (potential) collaborations with university institutions. The number of participants was decided based on theoretical saturation, i.e., it was informed by the identification of relevant cases and concepts, rather than focusing on collecting data from a specific number of people (Corbin & Strauss, 1990). Therefore, data collection stopped when few non-redundant data were being collected, suggesting that saturation is reached, and we had sufficient information to understand the phenomenon.

We utilised a purposive sampling approach, a technique advocated by multiple researchers (Cohen et al., 2013; Ritchie, 2003). This method of inquiry is defined by Ritchie (2003, p. 77) where "members of a sample are chosen with a purpose to represent a location or type in relation to the criterion". To understand digitalisation and virtualisation in nonprofits, through non-profit/for-profit interactions, the main criterion was to identify participants within the non-profit sector in the UK (Table 2).

Each interview lasted approximately 40–50 min and was guided by a consistent interview guide (Appendix A). Adopting a semi-structured interview approach added depth to the data collection process especially when dealing with topics of a sensitive nature (Morse & Corbin, 2003). After the completion of the interviews each session was transcribed verbatim and analysed thematically to identify the key points and links.

The authors utilised thematic analysis to identify the key themes embedded within the data. The approach of thematic analysis is a popular method used to investigate patterns between qualitative data collected from interviews (Braun & Clarke, 2006). While it is an iterative approach, it is comprehensive in helping researchers identify, analyse, and interpret patterns of meaning within data. We followed the approach of Braun and Clarke (2012) and Fereday and Muir-Cochrane (2008) by splitting the approach into six phases. Table 3 outlines the first three steps that we took.

Braun and Clarke (2012) advocate a further three phases in the thematic analysis process: reviewing the themes; defining, and naming themes; and producing the report. We undertook these three remaining phases in line with producing our analysis. To confirm the themes the research team followed the 'agreement as a proxy for accuracy' approach. There-

Table 2 List of participants

Interview	Type	Position	Focus
Interview 1	Charity PLC	CEO	Unemployed, Disabled, vulnerable
Interview 2	Charity PLC	Trustee	Refugees, LGBTIQA+
Interview 3	Charity	COO	Mental health
Interview 4	Community group	Manager	Elderly, vulnerable
Interview 5	Community Hub	Manager	Community, Vulnerable
Interview 6	Charity PLC	CEO	Digital Divide, Rural
Interview 7	Charity PLC	CEO	Volunteering
Interview 8	Community Centre	Trustee	Community
Interview 9	Charity PLC	CEO	Vulnerable, foodbank
Interview 10	Volunteer non-profit	Co-founder	Mental health
Interview 11	Non-profit	Trustee	Community support
Interview 12	Non-profit	CEO	LGBTIQA+
Interview 13	Volunteer non-profit	Co-founder	Refugees

Table 3 Phases for thematic analysis. (adapted from Braun & Clarke, 2012)

Phase	Description of the process
1. Familiarise yourself with the data	We spent time reading the transcripts and familiarising themselves with the data. King and Horrocks (2010) discuss the importance of immersion in the data to get a 'feel' for the nuance, the detail, and the overall narrative.
2. Generating initial codes	In line with a data-driven inductive approach (Firth & Gleeson, 2004), we generated the initial codes to ensure we 'captured all'. We also made notes as these initial codes emerged to help with grouping/clustering in the next stage.
3. Searching for themes	This stage took several weeks as we dealt with the 'messy' and iterative processes of searching for themes, 'to-ing' and 'fro-ing' between the transcripts and coding (Waller et al., 2015). These processes allowed for the clustering of related data, and thus emergent themes.

fore, the research team joined and agreed on themes over a series of meetings, enabling each member to bring their own perspective into the data analysis (Symon et al., 2016). Table 4 below provides an example of how we moved from the initial codes, to clustering and then agreement on the final naming of the themes.

4 Findings

According to the participants, charities use a mix of digital tools, including cloud-powered platforms (such as Microsoft 365 or Google Docs/Forms), information and communication platforms (such as Zoom and Microsoft Teams) and social media platforms (like Facebook and X) to support their operations and interaction between employees, volunteers and beneficiaries. By being easy to use, relatively low-cost and widely adopted, social media and communication platforms enable nonprofits to (a) communicate and raise awareness about social issues, (b) attract new members and volunteers, (c) engage with their existing members, and (d) collect ideas and feedback to improve their services and the effectiveness of their operations. This is in line with Xue and Zhou's (2023) work, which discusses the influence of social media tools in developing fundraising and strengthening relationships for societal benefits.

Table 4 Moving from data to themes

Initial coding	Clustering	Key theme(s)
Software applications Cloud platforms Social media platforms Web-based information sharing Communication technology	Communication and information sharing Stakeholder engagement Promotion and awareness Facilitating operations/tasks	Adoption and use of technology
Limited employee/volunteer knowledge and skills Lack of member access to digital technologies Lack of digital resources/information Lack of digital information Inconsistent technology use amongst partners	Digital illiteracy Lack of accessible technology Organisational challenges of technology use	Digital imbalances
External stakeholders and networks to support operations Partner engagement opportunities Resource sharing Knowledge and capabilities sharing	Strategic partnerships Need for collaboration	Goal alignment
Limited technology experience Confidentiality and sensitivity of information Vulnerable members Stakeholder understanding and empathy	Technology trust Inter-organisational trust	Trust

Similarly, the use of cloud platforms, including Google Forms and Google Sheets, has been discussed by several participants. These platforms offer employees a way to share information with each other and with the organisation, improve their efficiency, manage and organise their operations, track their activities and maintain transparent and reliable records. This is in line with existing literature (e.g., Apostolidis et al., 2021, 2022b), supporting that such digital technologies can transform the way that organisations interact with their employees, members and other stakeholders, and support their operations. By improving the efficiency and transparency in communication and information sharing, these technologies can lead to more meaningful interactions with different stakeholders and help nonprofits achieve their mission:

> "Our mission is to build a community that takes care of each other. Social media and Zoom have enabled us to keep connected with our community."
> Interview 8.

> We used to do this face-to-face first thing every day, but this [Google Sheets] saves us and our volunteers a lot of time and commuting back and forth. And also allows for last minute changes and keeps records for every volunteer and member that is clear and available to everyone.
> Interview 10.

Following the identification of the types of technologies currently used by charities, we adopted an S-D logic lens to explore how non-profit digitalisation and virtualisation solutions can be achieved through their interactions with other stakeholders, and the role universities can play to support this process. The importance of focusing on interactions when exploring digitalisation and virtualisation efforts in non-profits has also been acknowledged by our participants, for instance:

> "As an organisation we have a good level of digital knowledge and capability, we adapted fast through the Pandemic. However, for future development, we will need support and expertise to develop more tools and technologies to support our delivery." Interview 7.

On the other hand, participants also acknowledge that not all interactions lead to value co-creation in the form of meaningful digitalisation and virtualisation technology adoption. According to our participants in many cases interactions aiming to support the digitalisation/virtualisation of their organisations' operations had actually led to the diminishment of the value the organisation can offer and negatively affected the digitalisation process:

> This is an area we are struggling with, since communications, access to benefits, payments and so on have moved online. As a result, our members have to rely on outsiders for assistance, which has led to exploitation as their trust has been taken advantage of.
> Interview 4.

Furthermore, our findings indicate that although our participants are aware of the vast range of digitalisation/virtualisation technologies developed and adopted in various other industries (such as customised mobile application and AI), the adoption or transfer of the technologies is not always a "top-down" process, based on the goals, mission and vision of the organisation. In many cases, the digitalisation/virtualisation approach adopted is rather a "bottom-up" one (Etzkowitz & Leydesdorff, 1999) as the introduction of new digital technologies is initiated through volunteer initiatives, based on the technological access and capabilities of the members, instead of strategic technology adoption by the organisation. This supports further the fundamental argument of this research that adoption of digitalisation and virtualisation solutions should also be explored based on stakeholder interactions and co-creation of value:

> We have an actively engaged team of volunteers who are committed to supporting the local community. They are a mix of young professionals and mature retired citizens. As a result, we have been able to learn from trends and adapt to evolving needs of society using digital tools.
> Interview 1.

> "We co-produce solutions with members of the community… to understand the needs of society and how together we can co-produce solutions."
> Interview 5.

Although this bottom-up approach to technology adoption and transfer ensures that some of the important stakeholders (e.g., members and beneficiaries) possess the required resources to interact with the organisation and co-create the value the nonprofits strive to offer, this approach is less strategic and more reactive to the preferences and capabilities of the other stakeholders in the ecosystem. This poses a limitation to the potential of the non-profit organisations to interact meaningfully with (potential) partners, such as for-profit organisations, which could help them to digitalise and improve their operations and services.

As our participants acknowledge the importance of supporting meaningful interactions (and avoiding problematic ones) with other stakeholders to support digitalisation, they also discuss the important role that universities can play in supporting these interactions, e.g., through education, knowledge-sharing, and network development activities. For instance, discussing their adoption of virtualised and cloud-based applications, one of our participants report:

> We had people from the university teaching us how to use better Microsoft 365 and Google Sheets to manage our daily tasks and our social media accounts to improve our digital presence.
> Interview 10.

In addition to supporting our decision to focus on non-profit/for-profit interactions for digitalisation/virtualisation and the establishment of universities as important stakeholders, our thematic analysis identified three key factors, namely trust, goal alignment and digital imbalances, that affect (positively or negatively) the interactions between for-profit and non-profit organisations, and as such they influence the digitalisation and virtualisation efforts. The following sections will present these three key factors in detail and discuss the role that universities can play in improving their impact on non-profit digitisation efforts.

5 Digital divide and the digital 'imbalance'

The first theme that emerged from our interviews relating to the factors that can affect interactions and digitalisation, relates to the digital divide between for-profit and non-profit organisations, and the opportunities that different technologies offer. We find that although nonprofits are aware of the "high-tech" landscape in different industries and the many benefits of the potential technologies they could adopt, the reality is that simple, easily accessible tools are often the key drivers in incorporating them in their operations and enabling value co-creation in their interactions:

> Currently the only type of technology we use is Google Sheets where each volunteer can easily find the places they need to visit and the members they need to see.
> Interview 10.

Nevertheless, our data suggest that this digital divide leads to digital imbalances between organisations. Compared to the digital divide that is generally discussed in the literature as a general phenomenon in the market, we define imbalances as the outcome of this digital divide, i.e., differences in technologies used by specific collaborating organisations, which may stem from two main reasons: digital illiteracy and lack of access. Research by van Deursen and van Dijk (2015) argues that as the use of the internet increases, digital literacy (i.e., people's understanding and skills in using digital technologies) decreases. Our findings expand on this, as we find that interactions between digitally 'imbalanced' stakeholders (e.g., for-profit and non-profit organisations) during digitalisation efforts may negatively affect the adoption of digital technologies, due to the limited capabilities, resources, skills or understanding of the organisation, its members, employees or beneficiaries. This suggests

that the interactions do not support the digitalisation efforts but lead to the diminishment of stakeholder wellbeing and the value the nonprofit offers:

> ” Recovery services find it difficult to engage with our platform due to differences in digital literacy and access to technology.“
> Interview 7.

Although lack of technical skills and access to technology are common themes in the digital divide literature (Apostolidis et al., 2021; van Deursen & van Dijk, 2015; Rijswijk et al., 2023), and can affect interactions between organisations in any industry, in the context of nonprofits the issue of digital imbalance is more challenging and long-lasting. Our participants highlight that access to digital technology could be limited due to organisational issues (as nonprofits and their employees may not possess the capabilities, resources or access required), but also individual issues as their members and beneficiaries may consist of minorities, individuals from disadvantaged backgrounds or other groups with limited technological skills and access. For instance, our participants highlight that despite all the investment and interactions with businesses and other stakeholders to digitalise their operations, the adoption of digital technologies was hindered by the lack of appropriate infrastructure (such as reliable internet connection) for many of the members in the communities they are working with:

> “Most of our members are digitally excluded, due to mental capacity, illness and language barrier.“
> Interview 4.

> “Barriers can abound – lack of access to tech is one but we have worked a solution to that. Lack of reliable broadband in rural areas is an ongoing issue.“
> Interview 5.

These imbalances largely affect technology transfer and adoption by non-profit organisations, and can even lead to value co-destruction, as they affect the ability of non-profits to achieve their mission and vision, the interactions between stakeholders to support digitalisation and the value-in-use of the new technologies (Akaka & Vargo, 2014; Vargo & Lusch, 2008). For instance, digitalisation attempts during the pandemic highlighted issues relating to digital exclusion and reduction in the engagement with some of their key stakeholders, which diminished the value the organisation created:

> We focus on keeping our community connected and during COVID, it was evident that the majority of our users were digitally excluded, for most of us kept connected via WhatsApp with only a few who could connect via zoom, but mainly WhatsApp. We are still paper driven as our members are mostly unable to connect digitally.
> Interview 4.

In this context, our participants highlight the role of universities as a meaningful partner that can enable and facilitate the digitisation process, while supporting knowledge and capability building for the various stakeholders involved in the value co-creation process:

> "We have been fortunate that our University Partner has facilitated and funded programs as part of their CSR… our partners have also provided support and assistance to create a sustainable partnership."
> Interview 1.

According to our participants, the role of the universities as partners is so important because it exceeds the dyadic relationship with non-profits, as universities can facilitate and support interactions within the wider ecosystem through knowledge transfer, capability building and access to resources for a wider range of stakeholders. As such the success of the UIC collaboration is evaluated not only based on technologies finally adopted by the organisation (e.g., Bernardos Barbolla & Casar Corredera, 2009) but also based on the long-term development of professional competences (Stock & Tatikonda, 2000) and the impact of this collaboration on different stakeholders (Kingsley et al., 1996; Roncancio-Marin et al., 2022). This is very clear in one of our cases, in which the university did not only facilitate technology adoption by the organisation but by its volunteers and members as well:

> "They [Universities] also had "open" sessions where they were helping our volunteers and people in the community set up their own accounts and explain to them how to use different apps safely to get help and access our services".
> Interview 10.

5.1 Trust

In addition to digital exclusion, another important factor that influences the digitalisation and virtualisation processes is trust. Trust has been identified as an important factor in technology transfer and adoption in several studies in the past (e.g., Oliver et al., 2020; Giaretta, 2013; Bellini et al., 2019). In our study our participants highlight two different types of trust, namely trust towards the technology and inter-organisational trust, which can add significant barriers to technology adoption. For instance, many non-profit organisations are still resistant about adopting and using technologies they are not familiar with, but also sceptical about interacting with stakeholders as part of the digitalisation and virtualisation process, particularly as they are dealing with sensitive societal issues and information. This scepticism can prove to be a significant barrier particularly in the virtualisation technology transfer process:

> "We prefer to keep our organisation as much "offline" as possible, as we are dealing with sensitive issues and vulnerable individuals and understandably there are concerns about who has access to the information stored, processed and shared online […] also both our members and our volunteers prefer a more human touch in our services, so we try to keep things face-to-face".
> Interview 12.

As nonprofits may be viewing digital technologies, but also for-profit organisations, with a level of suspicion, our findings suggest that non-profit/for-profit interactions must be under-

pinned with trust. In this case, our findings suggest that collaborating with reliable organisations can in turn improve perceived trust in digital technologies:

> "Safety of our members is the highest priority, we need to be able to trust that the partners have integrity."
> Interview 8.

Some research in social business has already investigated this and advocated the need for an arbiter of trust to facilitate interactions and technology transfer in non-profit organisations (Devine et al., 2021). Our findings highlight the role of universities as this 'trusted intermediary' in the digitisation process, as generally universities are considered by participants as trustworthy partners with high ethical and quality standards:

> In our case the biggest step was getting people from [name of university] to work with us to help us understand what we need and how to digitise our processes. There were many areas that we were unsure about, but having those experts working with us was a big help […] We then had the opportunity to work with other companies but we found the university more trustworthy and they had a similar commitment to supporting the local community.
> Interview 13.

In this context, in addition to the UIC indicators of success highlighted earlier, people evaluate the success of their collaboration with universities based on the development of new connections and the potential to (trust and) work with for-profit organisations (Giuliani & Arza, 2012).

5.2 Goal alignment

Finally, goal misalignment between non-profit organisations and the industry is also a significant barrier in value co-creation in digitalisation/virtualisation. Non-profit organisations acknowledge the need to collaborate with for-profit organisations to take advantage of the benefits of digital technologies and to achieve their goals. While organisations recognise the need for continuous development, capability building and access to resources in some contexts there is a need for support and guidance from more technically advanced organisations to support the adoption of more 'high-tech' solutions. This is the case not only for organisations with low technological capabilities, as the development of long-term, strategic partnerships will also benefit more technologically advanced organisations, who are looking for opportunities to create more value from the digital technologies they have adopted. Therefore, collaboration with the appropriate stakeholders will benefit the digitalisation/virtualisation opportunities of the nonprofits and can support value co-creation and avoid value co-destruction:

> "Where we find new tech that can assist the groups and communities we work with, we try to access it so we can demonstrate it to them. The latest example of this is Starlink Broadband. ……. We have run tech loan schemes for groups and set this kit up

> for them and we partner with our colleagues in LA to identify individuals who need support to access digital service provision."
> Interview 5.

In the discussions on collaboration and strategic partnerships, goal alignment emerges as a key theme for our participants. According to our findings, the alignment between the social mission and purpose of the organisation and any potential partners, is imperative for meaningful collaborations and technology transfer:

> "Their values and missions must fully align with our own. We do not compromise here as we are supporting the most vulnerable and marginalised members of the community."
> Interview 1.

Our participants emphasise that universities can be considered as a strategic partner that can support value co-creation in the long-term, as they can support the identification of appropriate partners but also enable the alignment of strategic goals between stakeholders through consultancy, knowledge sharing and skills development activities. For this to happen however, universities must also have goals consistent with the non-profit organisations, which includes a commitment to social objectives, while the universities can benefit from the data and networks developed as part of these interactions. By facilitating goal alignment between non-profits, industry, and universities, UICs can create a 'win-win-win' scenario that leads to sustainable relationships and enables co-creation of value:

> "Working with vulnerable, older, socially disadvantaged people impacts on our ability to roll out digital solutions quickly. We also do our work through partner agencies who are often stretched, overworked, and under-resourced so they have limited capacity to support."
> Interview 7.

> "By aligning and partnering with a local University we can spread the cost and the University would use the data gathered for other research purposes."
> Interview 9.

Conversely, a significant issue that highlights the importance of focusing on goal alignment is the notion that in many cases universities do not want to work with small charities, as they may consider the relationship not to be beneficial to them, while many nonprofits feel that they struggle to complete with larger, for-profit organisations (Sandoval Hamón et al., 2022). As discussed by one respondent:

> "To access partners and support is a challenge as we are competing with larger organisations and charities, being a small charity supporting a local elderly community, does not attract technology partners."
> Interview 4.

As the collaborations with for-profit organisations often emerge as a strategic move to address financial and resource constraints, long-term partnerships and goal alignment between partnering institutions becomes invaluable, both in terms of financial support and resource provision. Therefore, UICs can create additional value for non-profits, as (in addition to access to networks, training and resources) universities can provide a 'safety net' in cases where goal misalignment threatens the digitalisation process. However, a lack of organisational goal alignment can lead to the development of myopic, short-term relationships, which can affect digitalisation in the longer term. This is further exacerbated by the fact that many organisations find it difficult to engage with universities, considering them to be intimidating and confusing as partners, compounded by access issues:

> Eventually, our partnership was discontinued about a year ago, as it was mainly based on these two academics we knew personally. When they left the university, we lost our point of contact and we were unable to re-establish our relationship with them as we couldn't find who to get in touch with and all our efforts were to no effect.
> Interview 10.

This stresses the need to add the longevity of the university - non-profit collaboration as a way to evaluate the success UICs, in line with existing literature (Bouty, 2000; Cyert & Goodman, 1997; Geisler, 2001; Mora-Valentin et al., 2004; Santoro, 2000).

6 Discussion

In this study, we address a gap in existing literature by adopting a S-D logic lens to explore how interactions between for-profit and non-profit organisations can support the digitalisation and virtualisation in the context of nonprofits. As part of this we investigate the role that universities can play as intermediaries, in supporting this process. This differs significantly from earlier work in this area (e.g., Bamford et al., 2023; Jefferson et al., 2017; Hayter & Rooksby, 2016) who focuses primarily on the knowledge transfer process from universities (non-profit organisations) to the industry (for-profit enterprises). Our research contributes to this debate within the technology transfer literature, as we find that universities have a significant role to play in the transfer of digitalisation and virtualisation solutions from for-profit enterprises to non-profit organisations, despite their diverse and distinctive characteristics.

The key findings in this paper, as illustrated in our conceptual model (Fig. 1), highlight a trifecta of factors that can influence the interactions between for-profits and nonprofits and affect the digitalisation process. Our findings suggest that this trifecta also affects the role universities play as facilitators in these interactions as well as the way that the effectiveness of the UICs is evaluated. Based on the above, we argue that our research makes a number of important theoretical and practical contributions.

6.1 Theoretical contribution

Our research highlights the potential of digital technologies to enhance the services provided, improve efficiency and engage with their service users. In line with extant literature

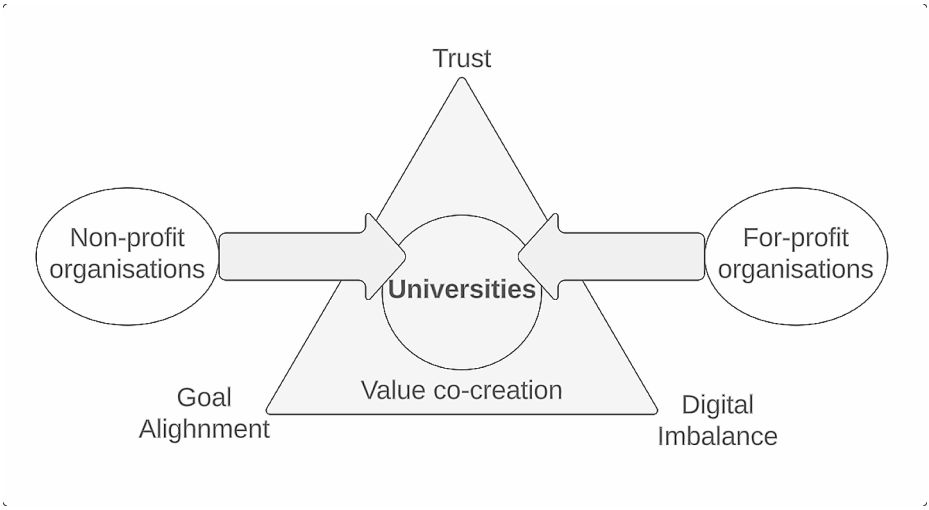

Fig. 1 Digitalisation through non-profit/for-profit organisation interactions

highlighting the need for organisations in the non-profit sector to adopt new technologies (Apostolidis et al., 2022b; Devine et al., 2021), our findings suggest that despite their distinctive characteristics (such as prioritisation of social mission and limited technological capabilities), nonprofits can benefit significantly from digitalisation and virtualisation efforts (Cipriano & Za, 2023; Brink et al., 2020; Jong & Ganzaroli, 2023). Our study however contributes to arguments of existing studies (e.g., Talavera & Sanchis, 2020; Gonzales & Yan, 2020), as we employ S-D logic to discover the importance of collaboration of nonprofits with other organisations that can support their digitalisation efforts and the factors that affect these interactions.

Our study illustrates three key factors that may affect non-profit digitalisation, as notated on each point of the triangle in our model. Supporting findings and earlier studies on technology adoption by nonprofits (Cipriano & Za, 2023; Apostolidis et al., 2021; Devine et al., 2021), our participants mention the need to consider goal alignment, trust towards technology and/or partner organisations and digital imbalances between stakeholders when investigating how to support digitalisation and virtualisation in the context of nonprofits. Extending the arguments made in previous studies however, our study explains that these three factors affect the interactions of nonprofits with other stakeholders in their ecosystem (e.g., for-profit organisations), which can not only negatively affect technology transfer and digitalisation, but lead to value co-destruction, i.e., the diminishment of the wellbeing of the stakeholders involved in the collaboration.

This research also sets out the potential role of universities and investigates how they interact with non-profit organisations to support digital technology transfer and promote value co-creation. Taking the view of Sandoval Hamón et al. (2022) who argue that the promotion of innovation and economic development is the third mission for universities, we argue that this third mission should be applied widely and not just focused on enterprise.

Ranga and Etzkowitz (2013) discuss the triple helix of innovation, within this context we define the role of universities as facilitators of value co-creation (hence their central position in our model). Our study reveals that universities have a significant role to play that exceeds

the 'traditional' dyadic approach in helping organisations to acquire and use technology effectively. Universities already have the potential to act as hubs of knowledge and expertise, and they already have skills and resources that can support non-profits. This underpins all of the other themes and there is a distinct need for creating collaboration opportunities and delivering tailored digital literacy training programs for non-profit staff and service users, thus aiding in overcoming the digital divide.

We argue however that the role of universities exceeds the narrow scope of developing the digital literacy required for their stakeholders to actively engage with digital technologies. There is clear potential for universities to support the partnerships between non-profit and for-profit organisations, to help them align their missions, fostering trust and addressing digital imbalances, by providing research and development support, provide access to networks and technological resources and even act as a safety net, enhancing trust and strategic partnerships between nonprofits and for-profits. This is something universities can undertake while also helping organisations absorb and navigate the cost and access issues by providing trustworthy advice and cost-effective digital solutions, offering their technical infrastructure, or advocating for policy changes that promote digital inclusion.

Although earlier studies have investigated the importance of some of these factors on UICs (e.g. Bellini et al., 2019; Oliver et al., 2020), by adopting a value co-creation lens, our study highlights the important role that universities can play as mediators in the technology transfer interactions that is an important element of non-profit digitalisation (Talavera & Sanchis, 2020; Gonzales & Yan, 2020). As advocated by Tian et al. (2022) the role of universities is crucial in leading industry collaboration. We extend this phenomenon and argue that they also have a fundamental role to play in transferring knowledge for digitalisation and virtualisation for nonprofits. By sharing technical knowledge and resources in addition to the design, guidance, and implementation of digital platforms, universities have a role to play in helping the development of meaningful collaborations.

6.2 Practical implications

The research offers multiple managerial and practical implications. Practically, the identified trifecta of factors is important because they represent both opportunities and obstacles for digitalisation and influence the role of universities and the way it is evaluated. When fostering future relationships and environments in which technology transfer manifests, we suggest that actors should plan to include conversations about these factors, attenuating the risk of them being ignored which may lead to value co-destruction, and promoting them to lead to value co-creation. The three factors surround the value co-creation 'space' (i.e., the triangle), where the interactions occur, permeates the space to represent an environment where value co-creation thrives.

Universities can assist in this process, providing non-profits, such as charities and community groups, with the skills, technology, and infrastructure to create holistic digitalisation and virtualisation solutions. The main challenge for universities is a managerial and practical issue which requires university institutions to broaden their scope beyond the dyadic relationships with industries and explore how they can become an intermediary that can support value co-creation within the wider ecosystem which includes organisations, individuals and (in the case of non-profits) the society. However, the other challenge for universities is supporting non-profit organisations through this process of change. As many of

the organisations we spoke to felt intimidated by recent technological developments and struggled to access resources and services, universities as intermediaries can make technology transfer more accessible and support more meaningful adoption of new technologies by various actors in the non-profit ecosystem. Based on our findings, our study can also inform practitioners regarding how the universities contribution in supporting non-profit/for-profit interactions and digitalisation/virtualisation efforts can be evaluated.

6.3 Limitations

Finally, it is important to note that there is no research without limitations. The current study elucidates some interesting concepts and topics relating to the adoption of digitisation and virtualisation technologies by non-profits, and thus one limitation we identify early on is that these organisations were relatively small and had limited resources and capabilities. Conversely, other larger organisations (social businesses, NGOs, large charities) may not face some of the challenges and barriers to technology adoption identified in our current research. We also recognise that another limitation was that all our non-profit organisations interviewed were based in the UK, a country with many high-quality universities and a relatively advanced level of technological infrastructure and awareness. From this perspective, non-profits operating in other countries/markets may also face slightly different opportunities and challenges, particularly in relation to what in our research we identify as "popular and mainstream" technologies, such as social media and communication tools. Therefore, looking forward, there is scope for future studies to build on the findings of this research and explore how higher education institutions in different countries and cultures could facilitate technology adoption in non-profit organisations and how they can support value co-creation considering the opportunities and challenges for stakeholders in a different environment.

Appendix A

	Question
Q1	How does your organization figure out which important problems or needs in society to focus on, and how do you feel digital technologies can help with these problems?
Q2	How important do you think digital technology is for your organization in achieving its societal mission, and what specific types of technologies would be most helpful?
Q3	What is your current level of knowledge and capability when it comes to using digital technologies in your operations and programs?
Q4	How do you currently collaborate with external partners, such as universities to develop your knowledge and skills and learn about new technologies?
Q5	How do you make sure that digital technologies and solutions created with outside partners are appropriate and effective for the communities you serve, especially if those communities have limited access to technology or are marginalized?
Q6	When collaborating with external partners to develop new technologies or solutions, what difficulties or obstacles have you faced, and how have you overcome them?
Q7	What ethical and social factors do you prioritize when working with external partners to share digital knowledge and skills?
Q8	Have you worked with universities or other partners before on digital technology projects, and if so, what has been your experience in terms of collaboration and learning new ideas and skills?

	Question
Q9	What specific challenges or barriers have you encountered in adopting or implementing digital technologies?
Q10	How do you know if a digital tool or service you provide has been successful?
Q11	How do you plan to involve your staff and other stakeholders in the process of adopting and implementing digital technology?

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