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The mediating role of digital innovation capability on the relationship between organisational agility and performance: the case of the UK arts and culture sector

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ABSTRACT

Through ten case studies followed by a national survey of 129 UK arts and cultural organisations, the present research explored relationships between organisational agility and the organisational performances of these organisations, via the mediating role of digital innovation capability. Study 1 involved case studies of UK museums, art galleries, theatres and performing arts organisations of various sizes and in disparate locations, the outcomes to which informed study 2, i.e. a national survey. The outcomes indicated the presence of significant influences of organisational agility on digital innovation capability. Organisational agility did not significantly influence performance in the absence of digital innovation capability. Publicly funded organisations increased their engagement with digital activities during the pandemic to a greater extent than privately financed organisations. The research demonstrates the critical importance of digital innovation capability and collaborative innovation as determinants of organisational performance within the arts and cultural sector, and in particular how organisations responded via digital transformation to the highly volatile environment created by the Covid 19 pandemic. Agility is shown to affect performance indirectly and not in a straightforward manner.

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1. Introduction

In early 2020, nonprofit and for-profit arts and cultural organisations across the globe closed their doors consequent to the Covid-19 pandemic (Ross, 2020; Vlassis, 2021), resulting in the rapid transition of many organisations to an entirely digital presence. Digital products (i.e. products primarily based on digital technology, existing in a non-physical or intangible form) were created for delivery in digital format to customers online, thus enabling members of the public to engage digitally with performances, exhibitions and related activities entirely online (Hadley, 2020; King et al., 2021). Examples of online events offered by well-known arts and cultural organisations during the UK Covid-19 closures include the National Theatre's live weekly screenings of pay-per-view plays, the Royal Opera House's screening of weekly live productions (priced between £5 and £15 per view), the Victoria and Albert Museum's online Orsola de Castro exhibition, and online access to the Compton Verney Art Gallery. The 'National Theatre at Home' attracted more than 10 million global streams (including 6 million from the UK) during the first eight weeks of its online offer (Worthington, 2020). Many cultural organisations created and offered free-of-charge ten to fifteen-minute walk-through trailer videos (e.g. of Tate Modern's Andy Warhol exhibition and the Royal Academy's Picasso exhibition) and free or low-cost screenings of 360-degree online gallery tours, videos of artists at work, online workshops and learning events, artist masterclasses and other virtual products.

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Some years before the onset of the pandemic, Srinivasan and Huang (2005, p. 196) commented that *'if performing arts customers were to grow accustomed to watching any form of entertainment from their bedrooms, the possibility of the performing arts becoming entirely digital is not as far-fetched as we may think'*. The authors argued that the live streaming of artistic performances promoted inclusion and accessibility and *'reduced or eliminated absurd ticket prices'* (p.197). Ross (2020) observed that during the Covid-19 lockdowns live streamed footage was usually of high-quality and enabled viewers to feel they had front-row seats, despite paying only a small part of the cost. Moreover, according to Meehan (2022, p. 425), online events could *'democratise cultural interpretation'*, and hence might attract diverse audiences considering that they do not have the *'aura'* associated with traditional cultural institutions. Audience appetite for digital experiences (including live streamed or recordings of productions, and productions created *'at home'* by performers) grew substantially during the pandemic, leading to further investment in digital offerings (Ross, 2020). Covid-19 disrupted the traditional business model of arts organisations and brought to the fore new hybrid models that not only entailed digitalisation (conversion of physical into virtual content) but also the digital technologies to provide fresh revenue and value-producing opportunities (see Rijswijk et al., 2020). Hybrid models have financial implications. Benefits can include cost savings and synergies available from process integration and the widening of audiences, but could also mean high upfront costs, problems of overhead allocation to digital versus non-digital activities, data security and software licencing issues, lack of financial balance between types of operation and possibly more complicated and expensive management systems (Endres et al., 2019).

1.1. The present study

Recent research featured within this journal has explored links between the impact of digital capability on digital organisational transformation and on its effect on performance, but mainly in the context of commercial enterprises (especially small businesses, see for example Lu & Shaharudin, 2024; Prakasa & Jumani, 2024; Valdez-Juárez et al., 2024). However, the situation relating to the arts and cultural sector remains unexplored. The present study investigated how non-profit arts and cultural organisations coped with the sudden onset of the Covid-19 pandemic via digital transformation. At the theoretical level, the investigation relates to the theory of Information Technology Innovation (see Kohli & Melville, 2019) which concerns the adoption of new digitally enabled processes and products. The theory suggests that digital artifacts new to an organisation are often applied consequent to *environmental* as well as technological change. Otherwise, although a plethora of innovation theories exist no uniform theory has emerged vis-à-vis digital engagement, possibly because each field of application is likely to be substantially unique (Markus et al., 2021). Also, according to Markus et al. (2021), extant theories of innovation do not differentiate digital transformation from other phenomena.

Many studies have established that organisational agility helps organisations to accommodate turbulent environments (cf. Dess et al., 2019; Shams et al., 2021), an important issue considering that the economic and societal turbulence created by Covid-19 was unprecedented in modern times. Agility, according to Alkandi and Helmi (2024), is a continuous development activity and a critical component of both innovation capabilities and organisational performance. The study examined the organisational agility capabilities of a sample of arts and cultural organisations, plus the effects of agility on digital innovation capability and organisational performance following the onset of the Covid-19 pandemic. A model was developed based on past literature which identified variables likely to affect organisational performance in terms of agility and innovation capability. The model was applied to a sector, arts and cultural organisations, not previously examined in past research in respect of these variables or in relation to an unprecedentedly volatile environment affecting arts and cultural organisations such as that brought about by the Covid-19 pandemic. Research of this nature is important considering the extensive contributions of the arts and cultural sector to national income and taxation, employment, inward tourism and cultural education. The sector makes similar contributions to the economies of many other countries.

The objectives of the study were to examine the influences of certain organisational forces affecting the performances of arts and cultural organisations during the Covid-19 pandemic and, within this context, to assess the potentially mediating role of innovation capability as a link between agility and

performance. A mixed methods approach of case studies and a national survey of UK arts and cultural organisations was employed to explore (i) aspects of organisational agility and digital innovation capability, and (ii) how these aspects impacted on an organisation's ability to (partially) maintain income and on audience satisfaction and reach. A mixed methods approach was deemed relevant in order to confirm (or deny) the predictions of literature in the field against real-life organisational experience.

Contributions of the research include its demonstration of the importance of digital innovation capability and collaborative innovation as determinants of organisational performance within the arts and cultural sector, and in particular how organisations responded via digital transformation to the highly volatile environment created by the Covid-10 pandemic. Agility is shown to affect performance indirectly and not in a straightforward manner. The predictions of past academic literature in the innovation management field are compared, through case studies, with the real-life experiences of arts and cultural organisations. The following sections review both the academic and practitioner literatures relating to the digital transformation of arts and cultural organisations and the literature on organisational agility; components known to exert significant influence on the innovation processes and digital transformation of organisations. The review is followed by an explanation of the mixed methods approach, an analysis and discussion of ten case studies, and an account of the survey data obtained from 129 organisations. Finally, the managerial implications of the study and future research directions are presented.

2. Organisational agility and digital innovation capability

During the pandemic numerous arts and cultural organisations embraced digital transformation in a variety of ways and quickly replaced in-person experiences and live performances with substitute online products (see NEMO, 2020). This is likely to have included reappraisals of activities with implications for (i) new hybrid business models and (ii) value creation via digital methods both for audiences and the arts organisations involved. Digital transformation assumed great importance for the well-being of many organisations in the sector considering that it provided opportunities for them to facilitate audience retention during the Covid-19 shutdowns and hence to remain financially viable (cf. Ansell et al., 2007; Malms & Schmitz, 2011).

2.1. Digital transformation and organisational agility

Digital transformation usually involves a complete rethink of how an organisation uses people, processes and technology throughout its operations in order to change operational performance, followed by the rapid implementation of (sometimes radical) change (Verhoef et al., 2021). It is a distinct form of innovation which relies on the combination of varied digital as well as physical components (Cheng & Wang, 2022). In general, digitalisation represents a challenging activity, and one that has radically transformed the ways in which organisations operate. Tortora et al. (2021) observed how, in the post-pandemic era, digital transformation has become an evolving process requiring organisations not only to rethink their entrepreneurial activities and offerings but also to examine and redefine their capabilities. Benefits arising from digital technologies can include cost reduction, improved access to resources and customers, increased customer and employee satisfaction, time saving, higher efficiency, and contributions to new products and services development (Pergelova & Yordanova, 2024).

An organisation's ability to respond quickly and effectively to changed circumstances is often referred to as its level of 'organisational agility' (Gerald et al., 2020; Nkuda, 2017). Organisational agility is a dynamic capability that helps an organisation quickly and competently to integrate, extend, and reconfigure internal and external capabilities to deal with rapidly changing situations, to transform and recombine resources, processes, operations, and assets (Wimpertiwi et al., 2024). An agile arts and cultural organisation will have a management that understands external environments and which reacts rapidly to threats and opportunities, using whatever methods new situations demand, while retaining its core mission as a cultural entity (cf. Holbeche, 2015). Open communication and horizontal management are often (but not always) found within agile organisations (Denning, 2016; Teece et al., 2016). Evidence from the (general) nonprofit sector has confirmed the existence of connections between organisational agility and performance in many charities (see e.g. Kirkpatrick et al., 2021; Kramer & Heuvel, 2019; Suh et al.,

2023). In the UK, for instance, Fox (2021) reported that the UK's Children's Society's capacity to respond swiftly and successfully to opportunities was due to its agile management practices, which were supported by the extensive use of open communication and cross-functional teams. Likewise, Fox (2021) continued, Prostate Cancer UK, profitably implemented agility across its entire organisation in order to allow quick rollouts of new online fundraising methods.

Agility refers to a set of activities implemented by organisations both to help cope with volatile and unforecastable environments (Chan et al., 2019) and to avoid 'rigidity traps' (Doz, 2020), and these activities apply equally to arts and cultural organisations. Research has found agile capabilities to include customer-oriented responsiveness (Moi & Cabiddu, 2021), flexibly harmonized objectives and resources (Hagen et al., 2019) and the ability to reconfigure marketing and promotional activities effectively and at short notice (Asare et al., 2020; Mashayekhi et al., 2011). Such qualities help an organisation survive environmental threats and to exploit changes as opportunities (Pergelova & Yordanova, 2024). Doz and Kosonen (2010) suggested that organisational agility was characterised by three specific capabilities: (i) sensitivity, (ii) resource fluidity, and (iii) leadership unity. 'Sensitivity' concerned a management's ability to sense changes and to identify fresh opportunities and threats within an organisation's environment. Resource fluidity related to an organisation's capacity to acquire a set of relevant new resources efficiently and at short notice. Leadership unity referred to collective managerial support of agility-related policies, resulting in faster and more effective decision-making. Organisational change theory posits that managers' abilities to exploit innovations depend on the context of a particular situation, their cognizance of the need for change, and their perceptions of the advantages of a new technology (Nambisan et al., 1999). Shirey (2015) found that leadership unity was often characterised by measures designed to create teamwork and open communications between various administrative levels within an organisation. Balog (2020) noted, importantly, that an agile organisation needs to have administrative and operational infrastructures sufficiently elastic to bear additional workload whenever this may be required.

2.2. Digital innovation capability

Agility can, moreover, facilitate 'innovation capability' (digital innovation capability in the present context), and consequently improve performance via the latter's mediating influence (Falahat et al., 2020; Sahoo, 2019). Ferreira et al. (2020) described innovation capability as a collection of activities that contribute to the creation and acceptance of new ideas which give rise to new products, services, or business models. Such considerations were highly relevant for arts and cultural organisations during the pandemic. Digital information capability involves a distinct form of innovation that relies on the combination of various digital as well as physical components (Cheng & Wang, 2022). Innovation capability in general will reflect an arts and cultural organisation's ability to integrate information, knowledge, resources, and tasks in order to supply the best offer to those it serves (Najafi-Tavani et al., 2018), plus its 'cultural openness to innovation' (Du Plessis, 2007; Lumpkin & Dess, 2015, p. 2). Ideas are translated into practical developmental activities that enable an organisation to respond effectively to changes in its operational environment (Maldonado-Guzmán et al., 2019; Phankhong et al., 2017). Positive consequences of high innovation capability, according to Atkinson et al. (2022), include improved employee productivity, reduced costs, and systematic expansion of an organisation's competence. However, the presence of innovation capability within an organisation requires its managers and other employees to be open-minded in relation to change, and to embrace new ways of thinking and working (Hung et al., 2011).

Innovation capability can arise in relation to an arts and cultural organisation's products and to its processes (Migdadi, 2020; Najafi-Tavani et al., 2018). Product innovation capability involves an organisation's capacity to configure its resources to provide new products and services that meet customer requirements (Hsiao & Hsu, 2018; Najafi-Tavani et al., 2018). Process innovation capability concerns the organisation's ability to change the methods and processes it employs to create new products or services (Aljanabi, 2020). High innovation capability can exist within micro-enterprises as well as in larger organisations (Zastempowski, 2022) and there is evidence of its presence within many arts and cultural organisations, including innovation vis-à-vis the broadening of audience reach and diversification and in respect of artform development (see Bakhsi & Throsby, 2010). Indeed, according to Miles

and Green (2008) there is much 'hidden' high level innovation activity within the cultural sector, especially 'soft' aesthetic innovation (p. 4). Winand and Hoeber (2017) noted, however, that the desire of a cultural organisation's management to adhere rigidly to its founding mission might restrict its willingness to innovate. Thus, Winand and Hoeber (2017) continued, innovations had to be consistent with a cultural organisation's core values. Otherwise, managers and staff might not see the necessity to innovate.

3. Study 1: Case studies

A preliminary qualitative investigation was undertaken to assess the relevance for arts and cultural organisations during the pandemic of the propositions stated in prior literature in the field. This involved ten case studies comprising a mixture of UK museums, theatres and other arts venues of different sizes and funding models and located in various regions. Findings from the case studies were then merged with themes prominent in academic literature in order to create a testable model. Study 2, in the form of a survey, was created to test this model (see Figure 1).

Interviews were held with curators, directors of revenue, box office managers, marketing managers and in several cases chief executives, within the ten organisations. Organisational profiles are shown in Table 1. All the organisations were known to the researchers via university contacts, personal networks or previous research and all were representative of cultural organisations significantly affected by the Covid-19 shutdown. Interviews were conducted in the 18 months following the reopening of all arts and cultural venues that occurred in late 2021, and during 2022. Participants in both the case studies and the subsequent survey were informed in writing about the study's procedures, benefits and other aspects before their participation. Only those who explicitly provided their consent took part in the study. Informed consent was obtained in written form.

An interview schedule was prepared and discussed with two art gallery directors and two theatre managers not connected with the current investigation. The interviews explored three main issues.

- i. What factors influenced an organisation's behaviour in relation to digital transformation?
- ii. Whether organisational agility affected the extent of an organisation's activities relating to digital transformation during the Covid-19 shutdowns?
- iii. Whether digital transformation led to positive performance outcomes in relation to (a) income, (b) audience reach and (c) audience satisfaction?

Examples of the interview questions were 'What measures for initiating or expanding online activities applied before, during and after the pandemic?', 'What helped and what hindered?', and 'What did you do to overcome problems vis-à-vis digital transformation?'. Following each interview, the respondent was emailed a summary of the outcome to enable the person to check its accuracy. Interview transcripts were coded using NVivo software. Codes for the interviewees' comments were generated using the constant comparison technique (Bogdan & Biklen 1982), i.e., provisional codes were allocated by each researcher (working alone) while analysing the first transcript, and the remarks of the second and subsequent respondents were then allotted to these codes whenever possible.

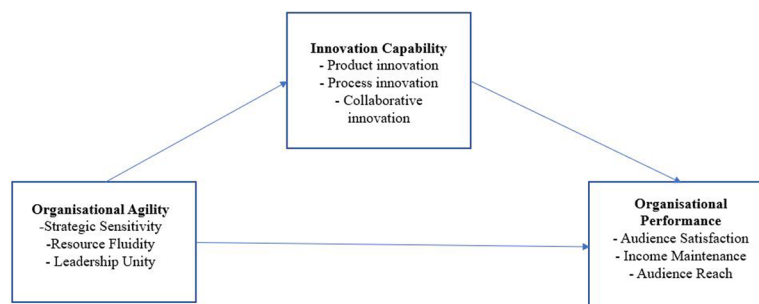


Figure 1. Research model.

Table 1. Organisational profiles.

Type of organisation	Location	Number of employees	Number of volunteers	Main funding sources
1. Museum/Art Gallery (General)	North of England	5	16	Donations, local government
2. Museum/Art Gallery (gender-specific exhibits)	South-east England	7	11	Donations, income from events
3. Music Museum/Performance Venue	Greater London	9	15	National government ^a , donations, income from events
4. Museum/Art Gallery	Greater London	11	15	Donations, fees from special exhibitions
5. Theatre (Local)	South-west England	23	40	Local government, ticket sales
6. Ethnic Arts Venue	Central London	29	45	Donations, income from events
7. Theatre (Regional)	Midlands	66	44	Local government, ticket sales
8. Theatre (Regional Producing Theatre)	South-east London	87	103	National and local governments, ticket sales
9. Opera Company	North of England	112	64	National government, ticket sales
10. Museum / Art Gallery (National)	Central London	950 (approx.)	500 (approx.)	National government, donations, fees from special exhibitions

^aNational government funding to cultural organisations was significantly reduced in 2021/2022. All the organisations were nonprofit, each having a unique historically determined ownership arrangement.

It emerged that all the organisations had quickly increased their digital activities (mainly online performances, exhibitions, and workshops) following the Covid-19 closures. In case 8, for instance, the play being performed at the onset of Covid-19 was filmed the moment closures seemed likely, as were actors who read stories to be streamed in podcasts. Unfortunately, sales of the live streaming of the play only raised £26,000, compared to more than £500,000 expected from live performances. Certain common themes arose from the interviews. Digital activities were welcome, but had severe negative effects on revenues (many of the new digital offers were offered to audiences ‘for free’). All the organisations had greatly increased their employment of social media during the pandemic, and this had continued thereafter. There was no evidence of differences in innovative tendency between organisations receiving national and/or local government funding and those not in receipt of state funding support. Table 2 lists the major themes (discussed in some way or other by nearly all the interviewees) derived from the case studies, together with indicative comments pertaining to each theme.

In line with literature in the field, ‘flexibility’ (aka ‘agility’) was regarded as essential, regardless of organisational profile. Overall, moreover, there were discernible substantive similarities between the interviewees’ responses and the elements of agility previously mentioned in academic literature: sensitivity (the ability to sense the need to adapt to impending change), resource fluidity (the capacity to reallocate resources quickly and efficiently), and leadership unity (all the managers of an organisation being committed to the implementation of digital activities and working together to achieve successful outcomes).

An issue that appears frequently in past literature was not in fact mentioned at all during the interviews, i.e. the influences of funding sources (in the nonprofit context). Conversely, the need for collaborative activity with external organisations was mentioned by participants in eight of the ten cases. All the organisations had adapted rapidly to the new situation via online streaming, often with aid and assistance from other organisations, often within the arts and culture sector, but also from organisations beyond the sector, including those in IT and finance industries.

Drawing on the resource-based view of innovation management, Al-Taweel and Al-Hawary (2021) argued that collaboration often contributes to the innovation capabilities of organisations because it helps an organisation develop both its tangible and intangible resources. Often, it provides platforms for sharing knowledge, gaining insights, developing markets and accessing relevant stakeholders (Georgescu et al., 2022). Mechanisms of collaboration include regular communications, the establishment of structures for determining roles and responsibilities, exchanges of views on how best to exploit digital technologies and the identification of cost savings from sharing resources. Possible outcomes extend to improved productivity, more effective project management, increased know-how and potentially more interesting work for employees (Castañer & Oliveira, 2020). Also, collaboration provides a management with examples of (i) how other organisations have created new offers that satisfy customers’ current demands (Aljanabi, 2020; Li & Ghirardi, 2019; Najafi-Tavani et al. 2018) and (ii) how to change methods and techniques very rapidly (Aljanabi, 2020). In light of this, collaborative innovation was incorporated into the model tested during the second part of the investigation. In view of the

Table 2. Common themes.

Theme	Indicative comments
Audience attraction	<p>'Within days (of the Covid-19 shutdown) we had to develop a more sophisticated understanding of our audiences and of our reach and the impact of our (digital) activities.' (Case 4)</p> <p>'Before the shutdown we did not understand the importance of digital hybridity, to reach new audiences, to increase accessibility.' (Case 1)</p> <p>'Putting everything online meant we gained deeper relationships with our customer base and better client ties.' (Case 6)</p> <p>'Going digital has strengthened communications between ourselves and our audiences; attendance at physical exhibitions actually increased after the pandemic.' (Case 10)</p>
Leadership	<p>'The management takes care to make sure that staff exercise autonomy and work in closely knit teams. The structure is very equal from top to bottom and marketing policies can be changed really fast.' (Case 2)</p> <p>'Collectively everyone in the management team discusses and brainstorms together so everyone can participate and get their ideas across and be listened to and valued.' (Case 8)</p> <p>'All the people in leadership positions contributed their knowledge to make online a success, even those in finance who know little about arts and culture. This meant we could out and execute creative ideas more rapidly.' (Case 4)</p> <p>'Some difficult decisions had to be taken, so it was essential for everyone in management to work very closely together, so everyone understood developments as soon as they happened – collections manager, resource planning, participation programme, everyone.' (Case 10)</p>
Need for flexibility	<p>'A lot of decisions (during the closures) had to be made in less than a week.' (Case 8)</p> <p>'We are quite experimental anyway, but the pandemic helped us speed up our thinking (on digitalisation).' (Case 2)</p> <p>'Nimbleness is the link between organising and better box office.' (Case 7)</p> <p>'Every organisation had to be flexible (during the shutdown) in order to confront changing conditions.' (Case 5)</p> <p>'The pandemic forced us to be swift, sharp and sprightly.' (Case 1)</p> <p>'We had to be innovative, to proactively create changes, sense and respond to opportunities and threats.' (Case 6)</p>
Need for collaborative innovation with external organisations	<p>'Working with other organisations in the same situation brings lots of opportunities to try new things, to look at everything fresh, to copy other people's processes.' (Case 4)</p> <p>'To invest heavily in digitalisation requires help and advice from other theatres that have done it.' (Case 7)</p> <p>'Collaborative innovation (with other organisations) gives us access to a wealth of experience we do not have.' (Case 3)</p> <p>'Exchanging ideas and knowledge with external partners boosted innovation and sales.' (Case 8)</p> <p>'Lack of resources and time meant we had to reach out and collaborate, not compete, with external partners.' (Case 9)</p>

correspondence of the results from the case studies with the predictions of prior academic literature, the causal variables within the model follow the configuration suggested by Doz and Kosonen (2010) (see Figure 1).

4. Study 2: National survey

4.1. The sample

A questionnaire was emailed to named arts and cultural organisations listed on the official UK Arts Council website, resulting in 239 responses evenly spread across the UK. The Arts Council is the national development agency for creativity and culture and covers all parts of the country and small as well as large organisations. Thus, its coverage is reasonably representative of all UK arts and cultural organisations. After data cleaning, 129 fully completed questionnaires were retained. Half the 129-strong sample comprised theatres or performing arts organisations, half were galleries or other visual arts organisations. Thirty-nine percent of the organisations were publicly funded, 23% were privately funded, with the remaining 38% receiving income from both public and private sources. Eighteen percent of the organisations had a base in London, another 15.2% were located in the South-East of England, 12.55% in the Southwest, 13.4% in the Midlands, 13.4% 'other' and 5.4% in multiple regions.

4.2. Research instrument

Section one of the questionnaire queried organisational profiles (numbers of employees and volunteers, funding model and regional location). Apart from purely factual matters, items throughout the questionnaire were measured using five-point agree/disagree Likert scales. Organisational agility was adapted and

Table 3. Digital engagement among organisations (by funding source).

	Privately owned (n=30)	Publicly funded (local authority or national) (n=50)	An amalgamation of privately owned and publicly funded (n=49)
Before Covid-19 closures	23.1%	14.0%	16.3%
During the Covid-19 closure	61.5%	92.0%	81.6%
After Covid-19 social distance rules relaxation	15.4%	40.0%	55.1%

measured through 15 items based on Doz and Kosonen (2010), Doz (2020) and Kale et al., (2019). Following Al-Taweel and Al-Hawary (2021), the agility items were grouped under headings for sensitivity (five items, e.g. 'This organisation anticipates future customer needs'), resource fluidity (five items, e.g. 'This organisation can quickly take on additional heavy workloads whenever required') and leadership unity (five items, e.g. 'Managers of the organisation worked as a team to employ the organisation's resources effectively during the Covid-19 shutdowns').

Digital innovation capability during the pandemic was assessed through ten items informed by García-Muiña et al. (2019) and Della Corte et al., (2017). These were split into (i) digital product innovation (five items, e.g. 'We had the ability to capture and promote innovative digital change during the Covid-19 shutdowns') and (ii) process innovation (five items, e.g. 'During the Covid-19 shutdowns our organisation had internal processes capable of generating ideas for introducing innovative new digital products'). Collaborative innovation was measured via four items based on the outcomes to the case study interviews, e.g. 'During the Covid-19 closures we regularly collaborated with other arts or cultural organisations and/or with external bodies such as national or local government agencies or other entities not involved in arts/culture'. Three ad hoc items measured organisational performance, i.e. 'Our online activities during the Covid-19 closures contributed significantly to (i) maintaining income, (ii) improving audience satisfaction and (iii) improving audience reach'. An ad hoc item questioned whether an organisation was digitally engaged before, during and after the Covid-19 shutdowns, i.e. 'This organisation was engaged in the production of online performances and/or online exhibitions before/during/after the pandemic'.

5. Results and analysis of survey data

A preliminary Pearson correlation analysis of interrelationships among the variables was completed, followed by a regression analysis using innovation capability as a mediating variable. Direct and indirect effects were captured via the application of Hayes mediation software to the estimation of the model (see Table 4). The latent variables in Figure 1 were tested for discriminant validity using the Fornell Larcker criterion (i.e. that the square root of the average variance extracted by a construct must be greater than the correlation between the construct and any other construct), this occurring in all cases. A test for common method bias (i.e. participants wanting to be seen to be more enterprising than was actually the case) was undertaken by examining the frequencies, means and standard deviations of the participants' replies to items that, a priori, might be expected to give rise to bias. None of the average percentages in the highest response categories of these items exceeded 26%, indicating the absence of substantial common method bias in the outcomes.

Items within each of the three subdivisions of the organisational agility construct were highly inter-correlated ($R > .75$ in all cases), and items in each subdivision correlated highly with items in other subdivisions ($R > .71$). The same pattern applied to the items within and between the product and process subdivisions innovation capacity ($R > .74$ and $R > .72$). Principal component analyses of the various subdivisions generated unidimensional leading factors with loadings exceeding 0.7 for all items of all the variables. Hence, the 15 agility items (Cronbach's $\alpha = .81$) were averaged to form a single agility construct, and the ten items for digital innovation ($\alpha = .79$) were averaged into a single construct. The four collaborative innovation items were intercorrelated ($R > .69$, $\alpha = .79$), as were the items measuring performance ($R > .72$). Hence each set of items was averaged.

Table 4. Test of model.

	Digital innovation capability	Collaborative innovation	Performance
Agility	.51 (t=6.17, p = .000)	.44 (t=4.19, p = .001)	.17 (t=1.10, p = .28)
Digital innovation capability			.61 (t=5.51, p = .000)
Collaborative innovation			.43 (t=4.0, p = .001)
R	.51	.44	.57
Overall effect = .42 (t=3.82, p = .001)			

Calculations based on 5000 bootstrap samples.

5.1. Descriptive results

No significant differences in the results emerged with respect to ‘type of organisation’ (theatre, museum, etc.). Examination of the outcomes for the profile variables revealed that size was an insignificant consideration with respect to online activities. Smaller organisations were just as likely to be agile, innovative and to perform satisfactorily during the Covid-19 closures as were larger organisations. It is relevant to note in this connection that staff within smaller arts and cultural venues often undertake double or triple job responsibilities, including digital marketing activities, and this may have created job interest and inclinations to attain positive outcomes that counterbalanced the resource advantages of larger establishments (cf. McNichol, 2005; Waitzman, 2021). The geographical locations of the organisations did not exert any significant effects on any of the other variables. Collaborative activity among the members of the survey sample was common. Seventy-two percent of the survey respondents agreed or strongly agreed that their organisation had engaged in some form of systemic innovation during the pandemic. Forty-eight percent of the organisations reported having received extensive or a large amount of favourable audience feedback during the Covid-19 closures, and a further 20% a moderate amount.

As regards an organisation’s source(s) of funding, a number of studies have suggested that innovation initiatives developed by nonprofit arts and cultural organisations can be heavily influenced by their relationships with national and/or local government and/or by their source of funding (public, private or hybrid) (see Hughes & Luksetich, 2004; Massarsky & Beinhacker, 2000). Critics have alleged that arts and cultural organisations directly controlled by the state are likely to lack initiative (Bertacchini et al., 2018; Besley & Ghatak, 2003), possibly resulting in their being less inclined than privately run organisations to digitalise their offerings consequent to the pandemic. A counterargument is that public funding normally requires evidence of effective and viable operational activity, attested by metrics and performance measurements (McDonald & Harrison, 2002), and this might impel organisations to utilise their public funding for innovative activity (Rentschler & Wood, 2001). In the present study, engagement in digital activities prior to the pandemic rose substantially during the pandemic, falling back after the pandemic. This pattern was broadly similar across all size categories of organisation (small, medium, large) and across all geographic regions. However, large disparities did occur with respect to type of funding. Table 3 shows the responses to the questionnaire items that asked whether an organisation was engaged in the production of online performances and/or online exhibitions before/during/after the pandemic. The table indicates that digital engagement (i.e. creating online events) during and after the pandemic was significantly lower in the private sector compared to publicly funded organisations and those with hybrid funding arrangements ($F=3.935$; $sig.=0.023$).

This relatively high level of engagement in digital activity by publicly funded organisations during the Covid-19 shutdowns could indicate that requirements for the development of digital engagement by public bodies (e.g., the Arts Council or local government funders) had a substantial impact on organisations vis-à-vis digital productions.

5.2. Test of the model

The model was tested using Hayes’ (2022) mediated regression software. Table 4 presents the results.

It can be seen from Table 4 that the direct effect of agility on performance was insignificant, meaning that agility of itself had no meaningful role to play in explaining performance. However, agility exerted

highly significant influences on both digital innovation capability and collaborative innovation. The more agile an organisation the more innovative it was likely to be with respect to these variables. In turn, both the mediators impacted significantly on performance, demonstrating the powerful transmission of the effects of agility on performance via the two mediators. This is evidenced in Table 4 by the significance ($p = .001$) of the overall influence of the pathways via digital innovation capability and collaborative innovation from agility to performance. Of itself, and without corresponding innovative capability, agility had relatively little influence on performance. This is an important result which suggests the need to avoid incorrect inferences within the sector under investigation regarding the nature of the relationship between organisational agility and performance. Nevertheless, the results underscore the critical roles of innovation capability and collaborative innovation as determinants of organisational performance for arts and cultural organisations.

6. Discussion and conclusion

Digital innovation capability had a significantly positive influence on performance, reinforcing the value to arts and cultural organisations of investing in digital transformation which, in correspondence with the theory of IT Innovation, occurred perhaps more in consequence of environmental change (the Covid-19 pandemic) than recognition of technological improvements associated with digitalisation. Online events have become an integral part of the UK theatre and museum landscape, and online performances and exhibitions are clearly here to stay (cf. Singh et al., 2021). Despite concerns that the provision of digital events is likely to result in negative financial consequences for the sector (UNESCO, 2020) it remains the case that digital events offered in parallel with live performances and exhibitions have the potential to increase total revenue, considering that these products can be targeted at substantially different markets. Ticket prices for online performances, exhibitions and other activities are far below those for live events, yet online streaming enables arts and cultural organisations to reach, and hopefully retain, new and more diverse audiences (King, 2018; Mueser & Vlachos, 2018). This has been a primary aim of government financial support for arts and cultural organisations for several decades. While some customers will use online events as direct *alternatives* to live visits, other viewers of online events (especially first or second-time viewers) might be enticed subsequently to attend events (and pay full price) in person. The outcomes to both studies in the present investigation suggest that most senior managers of UK theatres, galleries and museums recognise these realities. In line with the theory of organisational change the managers in the sample were cognizant of the necessity of change brought about by environmental circumstances, i.e. the Covid-19 pandemic.

An organisation's size did not affect the results of the investigation. Research in the general organisational behaviour area has found that organisation size often correlates positively with technological innovation (see Camarero et al., 2011; Shefer & Frenkel, 2005), essentially because larger organisations typically possess the financial and technological resources needed to innovate. This was not the case in the present study, however, where innovation capability seemingly existed to much the same extent in smaller as in larger organisations. This may have something to do with the motivations of managers, employees, and volunteers in the cultural sector. Indeed, smaller organisations may sometimes have greater creative flair than their larger counterparts (Waitzman, 2021), and might be able to pivot their operations innovatively and more quickly (McNichol, 2005). Irrespective of size, digital innovation capability emerged as a critical variable in the study; for without substantial innovative capability an organisation's ability to behave in an agile manner might not result in improved performance.

In correspondence with the findings of much prior literature, organisational agility constituted a major and powerful determinant of innovation capacity. Agility emboldened innovative adaptation to change; a vital competence in the digital context. Digital technologies affecting the arts and culture sector are increasingly sophisticated and, since agility lies within employees, keeping up to date with new developments requires the presence of an agile mindset among managers and staff throughout an organisation. The fact that agility of itself did not have a significant effect on performance underscores the crucial role of the mediating influence of innovation capacity. Agility seems to have helped organisations sense the need for change and then to have adapted quickly via digital innovation.

As regards performance, audience satisfaction, reach and income maintenance were highly intercorrelated, confirming the need for arts and cultural organisations constantly to strive to satisfy audience desires and thus frequently to obtain customer feedback. Sixty-eight percent of the responses stated that positive feedback had been received by the organisations regarding online performances or exhibitions. Satisfaction with online events may have resulted from their lower cost, viewing convenience, and/or wider penetration of fresh audiences (cf. Meehan, 2022; Ross, 2021; Srinivasan & Huang, 2005).

6.1. Theoretical and managerial implications

This study contributes to the literature on organisational agility, digital innovation capability and organisational performance in the context of the arts and cultural sector during a crisis. The Covid-19 pandemic affected 229 countries and territories; hence, the findings of the present study have relevance for many other parts of the world. Digital innovation has become a driving force for organisations in most countries (Elfaki & Musa, 2024) and the impact of digital technologies and their use on existing and new activities is accelerating worldwide. The results from the present study highlight the crucial mediating role of digital innovation capability in the relationship between organisational agility and performance. They extend contemporary knowledge of how organisations in the arts and culture sector can leverage agility to enhance performance through the development of digital innovation capabilities. Furthermore, the incorporation of collaborative innovation as a dimension of digital innovation broadens the conceptualisation of the causes and effects of innovation within the arts and cultural sector. The study also sheds light on the influence of funding sources on the digital engagement of arts and cultural organisations during the pandemic, offering insights into the role of institutional factors in shaping organisational responses to crises.

The findings of this study offer practical implications for managers in the arts and cultural sector. Firstly, the results emphasize the importance of cultivating organisational agility to navigate turbulent environments. Managers need to focus on developing sensitivity to changes, resource fluidity, and leadership unity in order to enhance an organisation's agility. Secondly, the study underlines the critical role of digital innovation capability in translating agility into improved performance. Thus, managers should invest in building an organisation's capacity for digital product and process innovation, as well as engage in innovation through collaborations with external partners. The importance of collaborative innovations was noted by eight out of ten of the case study interviewees and this was reinforced by the outcomes to the survey, which showed that collaborative efforts correlated significantly and substantially with performance. As suggested by the resource-based view of innovation management, managers typically recognised that the combined resources arising from collaborations can be synergistically exploited. Interactions of people from disparate organisations often leads to fresh ideas that create value. Managers in the arts and culture sector should therefore take every opportunity to extend and sharpen their skills in relation to the choice, development and execution of collaborative activities. The ability to assess and benchmark outcomes to collaborations is also important.

6.2. Future research directions

While the results of the study provide insights into the digital transformation of arts and cultural organisations in the UK during the Covid-19 pandemic, several aspects of the subject warrant further investigation. The present study did not explore issues relating to collaborative innovation in depth. Matters relating to the consequences of collaborative innovation within the arts and culture sector clearly require further investigation. Practitioner literature has noted both the high incidence of collaborative activity within the sector and how it can provide new and beneficial ideas for events. Collaborative innovation during the pandemic may have created better understanding of (digital) audiences and have 'opened doors' to new and useful networks (cf. Ostrower, 2005). Future research could explore in detail the critical elements of collaborative innovation and their specific consequences. For instance, how exactly does knowledge and information sharing actually occur? What are the roles within collaborative innovations of staff exchanges, joint promotions, giving and receiving help with marketing (especially social media marketing), assisting with grant finding and helping with approaches

to local and central government agencies (cf. Bruce, 2023; Langeveld et al., 2014)? There are moreover several barriers to digital transformation that could inhibit its implementation within the arts and cultural sector, including skills shortages, budget constraints, risk aversion and employee (and managerial) resistance to change, commitment to legacy systems and inappropriate cultural mindsets across an organisation (cf. Jones et al., 2021). Detailed investigation of the possible effects of such barriers would be valuable.

Other matters that the study was unable to explore were (i) longer term audience reception to digital offerings and long-term loyalty to a fully digitalised arts and cultural organisation, and (ii) the possible effects of performance indicators apart from those covered by the investigation, given that additional indicators might better capture the full spectrum of organisational success. An interesting finding was that during the pandemic publicly funded organisations, and organisations in receipt of public as well as private financial support, increased their engagement with digital activities to significantly and substantially higher extents than exclusively privately funded organisations. Was this due predominantly to pressures exerted by public funding agencies, or were other factors involved? If the latter, what were these factors? Another topic worthy of further research arising from the results is the determination of why smaller arts and cultural organisations seemingly possessed digital innovative capabilities to comparable extents as larger organisations, which presumably had more resources to devote to innovation activities. If the answer to this question relates to staff and volunteer motivation in smaller organisations, then both the details and the consequences of the motivational forces at play need to be examined. Furthermore, although the study highlights the critical roles of innovation and collaboration capabilities in mediating the relationship between strategic agility and organisational performance, the exact mechanisms through which innovation capability enhances this relationship need to be investigated in greater depth. Future research could explore the processes and practices that enable organisations to translate their agility into innovation outcomes, and subsequently into improved organisational performance. Identifying the key enablers and barriers to innovation capability development would provide practical insights for arts and cultural organisations seeking to optimize their digital transformation efforts.

Finally, as the digital transformation of the arts and cultural sector continues to evolve, longitudinal studies could be conducted to track the long-term impact of digital strategies on audience engagement, on financial sustainability and on organisational resilience. Research could examine how digital innovations, such as live streaming, virtual exhibitions and online audience participation, shape the longer-term future landscape of the arts and culture sector. Understanding the long-term implications of digital transformation would help the arts sector develop sustainable strategies and to adapt to the changing expectations of audiences in the post-pandemic world.

Ethics statement

Ethics approval for the study was obtained from Kingston University Business School Ethics Committee on 14 November 2022, ref. KBS/OU44-5A.

Author contributions

Roger Bennett: Contributed to the conception and design of the study and questionnaire, conducted data analysis, interpreted data, drafted the initial version of the manuscript, and critically revised it for intellectual content. Provided final approval for publication and agrees to be accountable for all aspects of the work. **Rita Kottasz:** Contributed to the conception and design of the study and questionnaire, collected and analysed data, interpreted data, contributed to drafting the paper and created tables to present the findings in the manuscript. Agrees to be accountable for all aspects of the work. **Pei-Yu Yuan:** Conducted data analysis, interpreted data, and created tables to present the findings in the manuscript. Agrees to be accountable for all aspects of the work.

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Data availability statement

The data for the study is available from the corresponding author on reasonable request.

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