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Adapting to the digital wave: tour guides' role perception and technological integration in the cultural ecosystem

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The COVID-19 pandemic has underscored the importance of digital technologies in the cultural heritage domain, particularly in the evolving landscape of the hospitality ecosystem. This ecosystem, prioritising personal interactions and improving life quality, demands a strategic change from cultural organisations to address the challenges of digitalisation and the shifting patterns of visitor engagement. Tour guides are central to this adaptation process since they play a pivotal role in the cultural sector. Thus, our research delves into how these guides perceive themselves and adapt to digital tools, impacting their ability to offer genuine cultural experiences. These experiences are fundamental in promoting sustainable tourism, reinforcing local identity, and nurturing community bonds. Our findings disclose a spectrum of different types of tour guides, each group characterised by distinct levels of digital skills and willingness to embrace technological change. Through this study, we aim to contribute to the theory of the digital cultural ecosystem by highlighting the significant role that culture and creativity play, supported by digital advancements, in formulating comprehensive and integrated strategies for cultural tourism management and the overall hospitality sector.

KEYWORDS

digital cultural ecosystem, cultural tourism, technology acceptance, cultural organisations' sustainability, tour guides

Introduction

The COVID-19 pandemic has caused an unprecedented emergency that has modified the consolidated habits and lifestyles of many individuals, organisations and whole sectors, especially cultural heritage management and cultural tourism. Due to travel restrictions and forced closures of museums and cultural organisations, cultural professionals and workers have suffered from unexpected loss of revenues and even jobs (Demartini et al., 2021). As long as the need for keeping social distancing persisted, digital technologies had and may still have a great positive impact in providing applications that support cultural visitors, either online or while on the move (Kourouthanassis et al., 2015). The COVID-19 experience has

boosted the use of digital technologies in cultural organisations (Agostino et al., 2021; Nasta and Pirolo, 2021) and even now, the positive impact of digitisation may also affect traditional services for cultural visitors and tourists, such as cultural tours. Indeed, technological advancements have broadly influenced museums and other historical and cultural heritage places, with countless instances of how digital solutions have been used to provide a more inclusive experience for visitors (Parry, 2013; Naramski, 2020). Continuing along this path, a larger and better use of digital technology may enhance cultural output development, distribution, and valorisation (Evrard and Krebs, 2018).

What has become unmistakably clear from the COVID-19 crisis is the permanent shift in museums' perceptions towards the digital realm, illuminating pre-existing challenges while fast-tracking ongoing transformations. Despite the economic downturn posing substantial barriers in terms of financial and human resources available for investment, an increasing number of institutions now recognize digitization's critical value. Between Autumn 2020 and Spring 2021, there was a notable surge in the number of museums initiating or planning enhancements to their digital infrastructure and resources (ICOM, 2021). In light of this shift, the support of governments and international organizations in aiding museums through their digital transformation processes has become crucial. This backing is essential not only for the immediate recovery and adaptation of these institutions but also for ensuring their long-term resilience and relevance in a rapidly evolving digital landscape.

These technologies enable audiences and cultural-creative objects to engage more efficiently and rapidly. Visitors and tourists may now not only access sources of information and knowledge about cultural items but also actively participate in developing their cultural experience, thanks to digitisation (Kramer et al., 2007; Elgammal et al., 2020). As a result, new production and consumption modes that stress audience engagement are required in the cultural sectors. Additionally, encouraging creative and innovative approaches, such as creating new tools and methods for optimising the consumption and valuing of cultural-creative products and tourism experiences, is critical. This updated scenario, shaped by the advancement of digital technologies, introduces fresh challenges for professionals in the cultural heritage sector. Their traditional technical expertise must now be integrated with new skills pertinent to the utilization of technological tools. Thus, these professionals and organisations need to redefine roles and capabilities. In fact, when treating technological innovation as an external shift and acknowledging the creation of new ways of conceiving cultural experiences, it becomes crucial to comprehend the new competencies required to excel in the sector. Consequently, it is critical to look at the attitudes of those working in the industry toward change, to see whether there is any resistance to change. If they do, this behaviour may hinder

the ability of cultural organisations to meet the opportunities of digitalization. Consequently, cultural organisations need to identify some levers and stratagems to envision their role and to instil the renewal enabled by digital technologies.

This creates the groundwork for a disintermediation that calls into question the function of intermediaries themselves, redefines the value of technical specialists, and presents cultural professionals with unprecedented problems. This is especially important in extremely traditional settings like museums and historical and cultural heritage institutions, where standard commercial models and management criteria are not always the most productive environments for promoting and/or facilitating changes. Scholars disputed the significance of sponsored cultural groups in encouraging creativity and innovation based on this notion (Selwood, 2009). Museums were traditionally thought to be stagnant and disinterested in change and progress. More lately, there has been a growing emphasis on making an economic effect and, most importantly, boosting audience involvement. As key components of cultural ecosystems, museums and other cultural organisations are central in fostering social innovations, such as nurturing creativity and innovation with the participation of several other actors in the ecosystem. Creativity and innovation thus "pertain to a number of things including changes in institutions' outlooks and management, if not the transformation of their profit-making capacity" (Selwood, 2009, p. 233). Individuals are a major source of creativity and innovation; therefore, such a shift argues for rethinking employees' roles in conventional cultural organisations (Pratt and Jeffcutt, 2009). A prolific stream of research has investigated technology adoption and diffusion in tourism and hospitality applying the technology acceptance models (El Archi and Benbba, 2023). Fewer attempts focused on cultural ecosystems and hospitality. Thus, this research aims to explore the attitude of professionals working as intermediaries in cultural ecosystems towards technological change and the impact of digital technologies on their perceptions of role redefinition.

With this study, we want to provide a twofold contribution: first, we contribute to the ongoing discussion about the future of cultural ecosystems by identifying the evolution of professional roles that are crucial in determining the effects of digitalisation on cultural ecosystems; second, we attempt to highlight what constitutes a "good" integration of cultural and creativity-based products, services, and processes in the cultural ecosystems with technological solutions to produce high-value innovations and cultural enhancement as part of social innovation.

We adopt a quantitative approach based on combining the technology acceptance model (TAM) and the sensemaking approach to assess the evolution of the role perceptions of pivotal actors in the cultural ecosystems, such as the touristic guides.

Theoretical background

Tour guides and technology adoption in the cultural ecosystems

Over the past decades, the literature has nurtured the idea that cultural organisations do not work in isolation but are rather embedded in networks (e.g., Scheff and Kotler, 1996) and cultural networks, rather than a single organisation, are more likely to produce innovation and generate value (Bagdadli, 2003; Scrofani and Ruggiero, 2013). Building on the network dynamics, a research stream has emerged that focus on cultural ecosystems and their role in favouring social innovation. Some researchers have compared and discussed the similarities and differences between biological ecosystems and societal ecosystems (Despeisse et al., 2012; Battistella et al., 2013). This exercise sheds light on the management of innovation and technology from different angles. Research in this stream aims to reveal the dynamics and patterns of ecosystems and organisational behaviour. The multi-actor network is not static, but dynamic as the network changes as well as the perceptions of the actors. The purpose of such ecosystem approach is to clarify the dynamic change mechanism of the multi-actor network and find the specific patterns of evolution and extinction. The understanding of this mechanism represents a prerequisite to be able to design and manage the ecosystem strategically.

Regarding cultural ecosystems, to the best of our knowledge, just a few attempts have been proposed to conceptualise what social innovation ecosystems entail and how they produce value for their actors and the society. Among these, Fernandez (2022) proposes a framework that represents the sectors and factors that must intercept for social innovation ecosystem to occur. Factors that are needed include cultural heritage, as the content of socially innovative services, and social needs, such as, for example, education, integration, access to culture, democracy and participation.

Digital resources have aroused particular interest in the cultural ecosystems as they are considered capable of attracting a wider audience (Kalay et al., 2007; Corradini and Campanella, 2013). The literature on innovation ecosystems has pointed out that digital technologies may favour interaction among actors, resources, and practices to facilitate an ecosystem's workability (Russo-Spena et al., 2020). Multimedia apps are becoming more important and popular among the communication tools museums utilize to assist visitors in exploring and understanding exhibitions. Screens of various sizes (typically touch screens), interactive installations and portable gadgets, near field communication (Angelaccio et al., 2012), Internet of Things (Chianese and Piccialli, 2014; Sestino et al., 2023), and virtual and augmented reality (Weber, 2014) are examples of these uses. Compared to traditional communication tools (e.g., captions, text panels, and guided tours), new technologies also allow the visitors to access information,

from both a quantitative and a qualitative point of view (Marty, 2007; Smith and Iversen, 2014). Video, music, and interactive tools can be presented in simple, rapid, customized, and effective ways in addition to text and images, commonly utilized in cultural contexts. Expressing it differently, digital innovation is critical in the cultural sectors, not only because of the inventive outputs, but also because it continuously presents new experiences (Peltoniemi, 2015). As a result, the employment of new technologies as an integrated part of creating cultural goods has steadily piqued interest in the literature on cultural economics and cultural heritage management (Marchegiani, 2017).

Despite these considerations, the organisational consequences of digitalising cultural ecosystems have received less attention. This is especially true regarding the influence of new technology on the skills, competencies, and abilities of positions in the cultural and creative sectors (Marchegiani and Rossi, 2016). Because innovation might result from an unusual recombination of components from the past (Messeni Petruzzelli and Savino, 2015), traditional knowledge must be coupled with information from different sources (Cannarella and Piccioni, 2011). Indeed, the pervasiveness of technology necessitates the development of new technologically relevant abilities by workers in the industry. From this standpoint, technology adoption and use has long piqued management and organisational attention (Orlikowski and Scott, 2008).

Recent research focused on the enactment process, which is concerned with how individuals engage with technology in their daily lives and what their situated usage of technology is (Orlikowski, 2000). Nonetheless, behavioural, social, and cognitive constraints make exploring and adopting new technology challenging at the organisational and individual levels. Identity is of special importance to them, both at an organisational and individual level (Gioia et al., 2000; Tripsas, 2009; Fishbein and Ajzen, 2011).

In the cultural ecosystems, tour guides have an essential role in connecting tourists to cultural objects and offering cultural brokerage, which includes presenting visitors with a familiar idiom (Cohen, 1985; Lin et al., 2017). They serve as a link between cultural institutions that own and administer cultural assets and the public. Therefore, tour guides play an important role in preserving and valorising cultural heritage, as they help visitors to have a complete and enjoyable experience. They are part of a network of relationships, institutions, and players that make up a functional organisational environment while not being incorporated into the cultural organisation (Sicca and Zan, 2005). In these networks, tour guides are considered industry specialists who can pique the public's interest in art and culture in general (Hwang and Lee, 2019). In fact, they are seen as possessors of art knowledge and the cultural worth of artifacts, but they can also communicate the hedonistic benefit of culture consumption and increase audiences' engagement levels (Hansen and Mossberg, 2017).

As a result, tour guides' adoption and use of technology should directly influence the digital valorisation of cultural assets. According to Bryon (2012), technological advancements lead to an increase in the need for tales. Consequently, tour guides' narrative abilities have become increasingly important. Their skills as translators and intercultural communicators have improved (Weiler and Black, 2014), and their communication capacity complements their jobs as experience brokers (Weiler and Walker, 2014). In this scenario, given their critical role in disseminating art and culture to the public, tour guides cannot stay immune to technological advancements, which present new opportunities for growth and obstacles (Weiler and Black, 2015).

Adoption of novel technology in any corporate environment is not always simple, and it can require a long journey. Models aimed at deploying the factors of technology adoption abound in the literature (Koul and Eydgahi, 2017). Among them, the TAM, which was created by Fred Davis in 1989 and subsequently developed by Venkatesh and Davis (2000) into its second version known as TAM2, has been widely used in the cultural sector, is one of the mainstream approaches (Peres et al., 2011; Huang et al., 2013). Studies of technology adoption in the cultural field may be divided into two categories: the acceptance behaviour of personnel in hospitality and tourism firms and the acceptance behaviour of tourists and visitors. For the acceptance behaviour of employees in hospitality and tourism organisations, TAM is widely used to examine users' acceptance of various technologies, such as marketing decision support systems (Wober and Gretzel, 2000), computerized reservation systems (Lee et al., 2006), Internet marketing (El-Gohary, 2012), using innovative information and communication technologies (Cheng and Cho, 2011). Conversely, the objective of the TAM in tourists' and visitors' behaviours is to determine the effect of external variables on an individual's internal beliefs about the usefulness and ease of use of a technology, attitudes toward technology use, intentions to use, and then actual behaviours (Davis, 1989). In both cases, the major findings of these studies are focused on the relationship between sensemaking and TAM, and specifically on the investigation of the processes through which sensemaking acts as an external variable influencing TAM.

Tour guides and role perception: a sensemaking perspective

Sensemaking is a constructivist approach focusing on how individuals in organisations participate in different sorts of sensemaking designs as they wrestle with what they are doing inside their companies, and what is happening past it. The sensemaking approach is particularly relevant to the investigation of authoritative change and arising innovation in cultural organisations as it gives a focal point through which people accomplish an inside and out comprehension of how cultural professionals, through examples of deciphering,

arranging, and acting, figure out the changes occurring around them. Significantly, in considering organisations as sensemaking frameworks, individuals inside these systems are ceaselessly attempting to decipher arising changes comparable to that which is more recognizable, and to make them conceivable and predictable (Weick, 1995).

Because technological development is associated with continual change, ambiguity, and fragility (Hogan and Coote, 2014; Anzola-Román et al., 2018), its management may be viewed as a sensemaking interaction between individuals at various levels of hierarchy (Christiansen and Varnes, 2009). People are put to the test to develop psychological constructs that allow complicated data to be transformed into useful settings (Weick, 1995).

Our study focuses on individual sensemaking, which is often rooted in the literature on social cognition. This field of study examines diverse frameworks, such as schema, schemata, interpretative schemes, mental maps, and representations, that humans use to make sense of a particular circumstance (Maitlis and Christianson, 2014). These many types of frameworks are referred to as frames, which are explanatory structures that characterize entities by explaining their relationships with other things (Klein et al., 2007). In this context, sensemaking refers to the act of fitting data (e.g., details) into a frame (e.g., an explanation) and then fitting a frame around the data. Individuals use an iterative process of framing and reframing to filter and analyse facts, form a coherent narrative of what is occurring, and establish specific meanings in a given context (Fiss and Hirsch, 2005). According to Goffman's (1974) initial conceptualization of frames, frames are schemata of interpretations that allow actors to make sense of ambiguous and diverse signals; that is, frames influence how individual actors view the world and their own interests. Goffman (1974) explains that individuals have several frames from which to draw at any one time, and that when we encounter a new experience, we tend to interpret it consciously or subconsciously considering our current frameworks. Long-standing research in management cognition has proven that cognitive frames control managerial attention and so impact organisations' reactions to changing circumstances, resulting in cognitive reorientation and strategic adjustments (Thomas et al., 1993; Kaplan, 2008; Balogun et al., 2015). In the context of technological sensemaking, frames may be viewed as the understanding of a particular technical artifact that incorporates not just information about the technology but also local understandings of specific applications in certain contexts (Orlikowski and Gash, 1994; Mishra and Agarwal, 2010).

This contextualization is a crucial aspect of our analysis of technology sensemaking, since the meaning of technology can only be defined (and its relevance understood) in the context of its usage and its users - in our instance, the potential utility of technology for the cultural sector. Indeed, tour guides might see technology as an opportunity to reconfigure and empower their

roles, or they may be unable to recast their roles in the new technology-driven competitive environment, and they may feel threatened by technological progress (Kramer et al., 2007).

Hypotheses development

Our study adopted a sensemaking-based perspective on technology adoption (Seligman, 2006; Schiavone and MacVaugh, 2009).

The sensemaking process among tour guides significantly shapes their perception of technology's utility in their profession. This perception can be either positive or negative, depending on how they interpret and adapt to technological changes.

Tour guides who approach technological advancements positively tend to develop a constructive perception of technology's utility. Their positive sensemaking allows them to view technology as an enhancer of their role, enabling them to mediate cultural experiences better and interact with audiences. This positive perception of technology's utility often leads to a more innovative and adaptive professional identity, increasing their job satisfaction and their effectiveness in engaging with their audience.

In contrast, tour guides who perceive technological changes negatively undergo a different sensemaking process. This negative perception often arises from concerns about technology replacing traditional aspects of their role or diminishing their importance as cultural mediators. As a result, they tend to view technology as detrimental to the quality of cultural experiences. This negative perception of technology's utility can lead to resistance to technological integration, impacting their job satisfaction and possibly hindering their ability to offer enriching cultural experiences. Therefore, the following hypotheses are derived:

H1a The positive perception of the utility of technology on the cultural experience and on the role identity as redefined by technological innovation increases the level of satisfaction in using technology.

H1b The negative perception of the utility of technology on the cultural experience and on the role identity as redefined by technological innovation decreases the level of satisfaction in using technology.

Likewise, tour guides who embrace technology as a positive force in redefining their professional role tend to have a more favourable view of technology's utility and its contribution to enhancing cultural experiences. Their recognition of technology as a tool that strengthens their role, through embracing technological developments, leads to an evolved perception of technology's usefulness in enhancing the cultural experience.

Conversely, tour guides who view technology as a threat to their traditional role exhibit a more negative attitude towards its perceived utility in the cultural field. These guides often see technology as diminishing their role as cultural mediators.

Consequently, their perception of technology's usefulness in improving cultural experiences shifts negatively, reflecting their apprehension about the impact of technology on their professional identity and effectiveness. Therefore, the following hypotheses are derived:

H2a The positive perception of the utility of technology on the role identity as redefined by technological innovation increases the positive perception of the utility of technology on the cultural experience.

H2b The negative perception of the utility of technology on the role identity as redefined by technological innovation increases the negative perception of the utility of technology on the cultural experience.

As far as the perceived ease of use of technology is concerned, it is hypothesized that this factor moderates the relationship between how technology's utility is perceived in redefining role identity through technological innovation and the satisfaction levels of tour guides. Specifically, tour guides who do not perceive technology as a threat to their role are likely to experience greater satisfaction from adopting technologies, even if these technologies are not particularly user-friendly.

In contrast, tour guides who view technology as a challenge to their professional role might experience reduced satisfaction when required to use technology in their activities. This decrease in satisfaction occurs regardless of the complexity of the technology adopted, underlining the impact of their perception of technology as a threat on their overall job satisfaction. Therefore, the following hypotheses are derived:

H3a The positive perception of the utility of technology on the role identity as redefined by technological innovation increases the level of satisfaction in using technology when the perceived ease of use of technology decreases.

H3b The negative perception of the utility of technology on the role identity as redefined by technological innovation decreases the level of satisfaction in using technology when the perceived ease of use of technology increases.

The proposed conceptual model is presented in Figure 1.

Methodology

Research instrument

We developed a self-reported questionnaire with a first part that consisted of six control variables relating to the socio-demographics of respondents. The second section, instead, consisted of 23 items used for our theoretical constructs. To capture the concepts of positive and negative perceptions regarding the impact of technology on cultural experiences and tour guide role identity, we took inspiration from Davis (1989). We adapted these items to incorporate the sensemaking perspective as outlined by Akgun et al. (2014). Perceived ease of technology use was assessed in accordance with Davis (1989),

FIGURE 1
Researcher framework.

Data collection and analysis
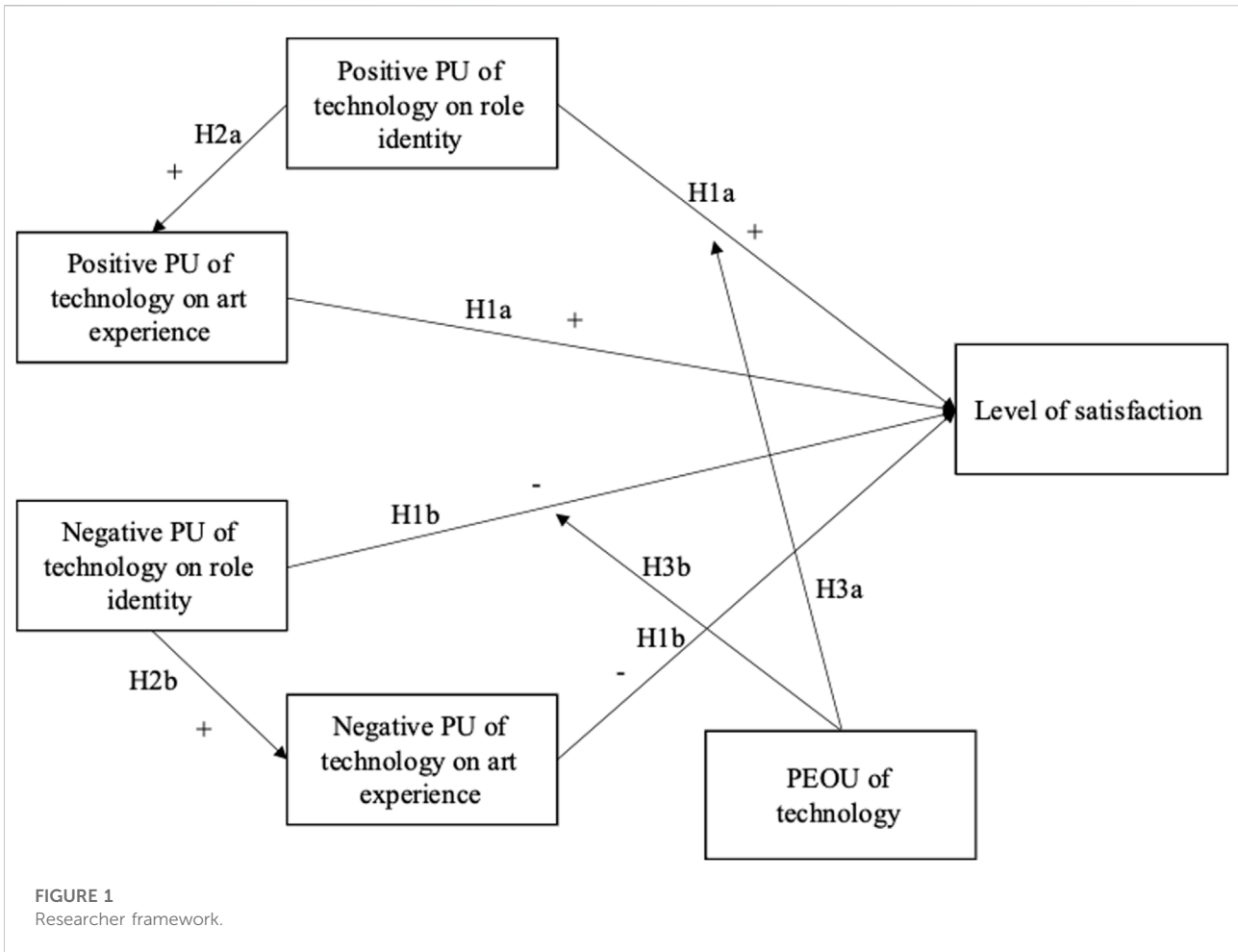
while the level of satisfaction was measured following the methodology of Chung et al. (2018). The complete list of these items has been reported in the Appendix A.

During the planning and design phases of the survey, several strategies were used to correct for biases often associated with cross-sectional questionnaire methodologies. First, to prevent non-response bias (Rogelberg and Stanton, 2007), the survey was tested by six students enrolled in hospitality and art management master programmes at Roma Tre University (Italy) and six cultural heritage professionals. The objective was to verify that the survey was created clearly and effectively, was simple to complete, was of an appropriate length, and had no grammar and/or lexical errors or unclear questions. The survey remained unchanged since neither the students nor the professional proposed substantial adjustments. Wave analysis allowed us to adjust for non-response bias (Armstrong and Overton, 1977). Comparing early replies (January-March 2022) to late responses (June-August 2022) based on essential characteristics, namely, demographic data and dependent variables, the T-tests revealed no statistically significant changes, offering reassurance against non-response bias.

We distributed the online questionnaire to 1,300 official Italian tourist guides through the contacts available online by Confguide, the national representation system in Italy of tourist guides, environmental guides and tour guides. We decided to focus on Italy because it is one of the most important countries for museums, art, and culture (UNESCO, 2021).

We collected 404 responses that were found to be an adequate sample size for structural equation model (SEM) analyses (Kline, 2015). We screened the data according to Hair et al. (2006), to identify any concerns with missing values, distribution of the data, and outliers using SPSS (version 26). We found no data issues.

To reduce social desirability bias and associated common method variance (Podsakoff et al., 2003), we emphasised in the survey's introduction part that participants' anonymity and researchers' confidentiality were ensured, as well as that respondents' participation was voluntary and uncompensated. In addition, in accordance with Podsakoff et al. (2003, p. 887), we distinguished between questions referring to independent

variables and ones pertaining to dependent variables. Lastly, a statistical approach, Harman's single factor test, was selected, and a main component factor analysis was conducted on all primary constructs. A common technique bias occurs when a single factor emerges from the factor analysis or when one general factor explains most of the covariance among the measurements (Podsakoff et al., 2003). First, we conducted a component analysis without rotation in SPSS; the result was a six-factor solution that explained 75.775% of the variation. The fact that the first component accounted just 28.079% of variation indicates that technique bias is not a significant concern in this study. As seen in Table 3, none of the intercorrelations had a value of 0.9 or above, with the greatest intercorrelation being just 0.417. Therefore, both tests reveal that common method variance is not a significant issue in this study.

We utilized SPSS to run descriptive statistics and reliability analysis on the acquired data, as well as to evaluate the demographic profile of the sample and the internal consistency of the constructs. Then, to assess the study model, we utilized SmartPLS 3.0 software for Partial Least Squares (PLS) analysis. Following the standard two-step analytical techniques for SEM, we first investigated the measurement model (validity and reliability of the measurements) and, subsequently, the structural model (Hair et al., 2013). To examine the importance of the patch coefficients and loadings, a bootstrapping technique (5,000 resamples) was employed (Hair et al., 2013).

Results

Sample description

Most tour guides were women (78%). Most of those who responded were between the ages of 31 and 40 (38%) and 41 and 50 (31%) years old. With a minimum age of 21 and a maximum age of 77, the average age was 42.5 years. Regarding geographical distribution, 68% of tour guides worked only in Rome, 10% in another city in the Lazio area, and 22% in other Italian regions. Furthermore, 78% of respondents said they worked in both museums and archaeological sites, while 11% said they only worked in museums and another 11 percent said they only worked in archaeological sites. The participants in our study had a diploma (15%), a graduate degree, (53%) and a post-graduate degree (32%).

Measurement model

First, the model's convergent validity was evaluated (see Table 1). This was determined with the use of factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE). All item loadings in Table 2 surpassed the suggested

value of 0.6 (Chin et al., 2008). Composite reliability values, which represent the degree to which the construct indicators indicate the latent construct, exceeded the recommended value of 0.7, while average variance extracted, which reflects the total amount of variance in the indicators that can be attributed to the latent construct, exceeded the recommended value of 0.5 (Hair et al., 2013).

The following stage was to evaluate the discriminant validity, which refers to the extent to which the measurements are not a reflection of other variables; this was demonstrated by low correlations between the measure of interest and the measures of other constructs. Table 3 demonstrates that the square root of the AVE (diagonal values) of each construct is greater than its respective correlation coefficients, indicating acceptable discriminant validity (Fornell and Larcker, 1981).

Recent critique of the Fornell and Larcker (1981) criteria shows that they do not reliably detect the absence of discriminant validity in typical research settings (Henseler et al., 2015). Henseler et al. (2015) propose an alternate method, based on the multitrait-multimethod matrix, to evaluate discriminant validity: the heterotrait-monotrait (HTMT) ratio of correlations. The results of a test of discriminant validity using this new approach are reported in Table 5. For the first criteria, discriminant validity is compromised if the HTMT value exceeds the HTMT.85 value of 0.85 (Kline, 2011). However, as indicated in Table 4, all values exceeded HTMT.85.

Structural model

To evaluate the structural model, Hair et al. (2013) recommended examining the R2, beta, and associated t-values using a resampling technique with 5,000 samples. In addition to these fundamental indicators, they advised that researchers additionally provide predictive relevance (Q2) and effect sizes (f2). We began by examining the relationships between the variables. The positive perceived utility of technology on both the cultural experience (b = 0.205; $p < 0.000$) and the role identity (b = 0.18; $p < 0.000$) positively affects the level of satisfaction. The negative perceived utility of technology on the cultural experience positively affects the level of satisfaction (b = −0.076; $p < 0.100$). On the contrary, the relationship between the perceived utility of technology on the role identity and the level of satisfaction is not statistically significant. Consequently, H1a is fully supported by our findings. H1b is partially supported. In addition, the positive perceived utility of technology on the role identity positively impacts on the positively perceived utility of technology on the cultural experience (b = 0.349; $p < 0.000$). Similarly, the negative perceived utility of technology on the role identity positively impacts on the negatively perceived utility of technology on the cultural experience (b = 0.221; $p < 0.000$). Consequently, H2a and H2b are supported by our findings.

TABLE 1 Convergent validity.

	Cronbach's alpha	Composite reliability	Average variance extracted (ave)
Negative perception of the utility of technology on cultural experience	0.878	0.916	0.731
Positive perception of the utility of technology on cultural experience	0.840	0.892	0.675
Negative perception of the utility of technology on role identity	0.778	0.869	0.690
Positive perception of the utility of technology on role identity	0.710	0.838	0.635
Perceived ease of use of technology	0.780	0.855	0.668
Level of satisfaction	0.746	0.733	0.500

The perceived utility of technology on the role identity and the cultural experience, both positive and negative, explains 15.9% of the variation in the level of satisfaction ($R2 = 0.159$), whereas the positive perceived utility of technology on the role identity explains 12.2% ($R2 = 0.122$) of the variance in the positive perceived utility of technology on the cultural experience and the negative perceived utility of technology on the role identity explains 14.9% ($R2 = 0.149$) of the variance in the negative perceived utility of technology on the cultural experience. The R2 values are greater than 0.10 as suggested by Falk and Miller (1992) as being indicative of a robust model.

We then evaluated effect sizes (f2). In the results, the *p*-value indicates the correlations' importance but not the impact's magnitude. Consequently, readers struggle to comprehend data and findings. Therefore, it is necessary to present both substantive significance (f2) and statistical significance (p). According to Hair et al. (2013), variations in the R2 value should also be investigated. We utilised Cohen's (1988) recommendations to determine the effect size, which is 0.02 for minor effects, 0.15 for medium effects, and 0.35 for big impacts. Table 5 demonstrates that all associations had a moderate impact. In addition to R2 and f2 values, the predictive sample reuse approach (Q2) may successfully demonstrate predictive relevance (Chin et al., 2008). Q2 indicates, based on the blindfolding technique, how well data can be empirically recreated using the model and PLS parameters. In this study, Q2 was determined utilizing redundancy methodologies that were cross-validated. A Q2 value larger than 0 indicates that the model is predictively relevant, whereas a Q2 value less than 0 indicates that the model is not predictively relevant. As seen in Figure 2, Q2 for both endogenous variables indicates adequate predictive validity.

This study expected that perceived ease of use of technology will moderate the relationship between the perceived utility of technology on the role identity and the level of satisfaction. The moderation effect is evaluated using the PLS product-indicator method. According to Chin et al. (2003), PLS can provide more precise estimates of moderator effects by accounting for the error

that weakens the estimated correlations, hence enhancing the validity of hypotheses (Henseler and Fassott, 2010). Perceived utility of technology on the role identity (predictor) and perceived ease of use of technology (moderator) were compounded to generate an interaction construct (PU of technology x PEOU of technology) to predict the level of satisfaction. As shown in Table 5, the calculated standardized path coefficients for the moderator's influence on the level of satisfaction is statistically significant for both the positive perceived utility of technology on the role identity (b = −0.124; $p < 0.100$) and the negative perceived utility of technology on the role identity (b = −0.116; $p < 0.050$). This suggests that considering perceived ease of use of different technologies moderates the relationship between the perceived utility of technology on the comprehension of one's role identity and the level of satisfaction. The plot in Figure 3 shows a steeper and positive gradient for low perceived ease of use of technology as compared to high perceived ease of use. Thus, this demonstrates that the impact of positive perceived utility of technology on role identity in fostering the level of satisfaction is stronger when technology is much more difficult to use. The plot in Figure 4 shows a steeper and negative gradient for high perceived ease of use of technology as compared to low perceived ease of use. Consequently, this demonstrates that the impact of negative perceived utility of technology on role identity in reducing the level of satisfaction is stronger when technology is less complex. Therefore, H3a and H3b were likewise supported.

Discussion

Theoretical contributions

With the fast advancement of digital technology, tourism and hospitality academics and practitioners are increasingly challenged to understand better how to assess and improve the efficacy of digitisation to improve visitor experience and

TABLE 2 Factor loadings.

	Negative perception of the utility of technology on cultural experience	Positive perception of the utility of technology on cultural experience	Negative perception of the utility of technology on role identity	Positive perception of the utility of technology on role identity	Perceived ease of use of technology	Level of satisfaction
Future use in daily routine						0.758
Satisfaction in daily usage						0.885
Increase productivity						0.645
Future use in general						0.752
Interaction clear						0.632
Flexible interaction					0.738	
Technology does what it must do					0.785	
Learning easy					0.845	
Usage easy daily routine					0.872	
Role reinvented				0.721		
Role enlarged competencies				0.794		
Role enriched				0.868		
Role unnecessary			0.762			
Role downsized			0.823			
Role restricted			0.901			
More interactive		0.768				
More educational		0.790				
More exciting		0.850				
More fascinating		0.874				
More boring	0.816					
More superficial	0.847					
More distractive	0.851					
More unrealistic	0.903					

TABLE 3 Discriminant validity.

	Negative perception of the utility of technology on cultural experience	Positive perception of the utility of technology on cultural experience	Negative perception of the utility of technology on role identity	Positive perception of the utility of technology on role identity	Perceived ease of use of technology	Level of satisfaction
Negative perception of the utility of technology on cultural experience	0.855					
Positive perception of the utility of technology on cultural experience	−0.417	0.822				
Negative perception of the utility of technology on role identity	0.221	−0.096	0.831			
Positive perception of the utility of technology on role identity	−0.17	0.349	−0.221	0.797		
Perceived ease of use of technology	0.083	−0.017	0.05	−0.012	0.817	
Level of satisfaction	−0.18	0.304	−0.129	0.268	0.047	0.707

encourage good behaviours (Bogicevic et al., 2019). COVID-19 has accelerated this process by pushing organisations to rely on the available digital technology (Akhtar et al., 2021). The digital acceleration induced by COVID-19 allows researchers and professionals to see how cultural organisations have acted, giving significant illustrations of what is coming.

Although digitisation is becoming increasingly pervasive, it might be perceived as an unexpected event by those unfamiliar with it and must deal with new technologies in the workplace. For these reasons, there are areas of resistance to change in the traditional cultural sector. This study focuses on the tour guides' comprehension and interpretation of digital technology implementation within the cultural sector. Traditionally, the TAM has focused on the intentions and behaviours of people as they accept or reject new technologies. However, this study aims to determine whether this acceptance is contingent on a sensemaking process that encourages tour guides to accept the new challenges presented by a technology-driven scenario.

We contributed to the study on technology adoption from a sensemaking viewpoint by looking at how tour guides rate their satisfaction with their job identity as it has been changed by technological innovation. Sociomateriality is based on the notion

of sensemaking (Weick, 1995), and it allows for a more comprehensive understanding of the social construction of technology deployment, as well as the continuous usage and modification of technologies in the workplace (Leonardi and Barley, 2010). Sensemaking, defined as "people's efforts to comprehend unfamiliar, unexpected, or confusing experiences" (Maitlis and Christianson, 2014), is critical in organisations and has a significant influence on innovation and creativity (Hill and Levenhagen, 1995; Drazin et al., 1999). The research findings, which focus on the museum and historical and cultural heritage industries, show that conventional jobs such as tour guides may adopt alternative positions in dealing with the digital wave. Role-conservative tour guides are resistant to change, which affects their level of satisfaction with providing cultural experiences using new technologies. Indeed, the findings show that, while the negative perception of the utility of technology on role identity has no effect on level of satisfaction, the negative perception of the utility of technology on role identity influences the negative perception of the utility of technology on cultural experiences, which in turn influences the level of satisfaction. The utility of technology is irrelevant in determining
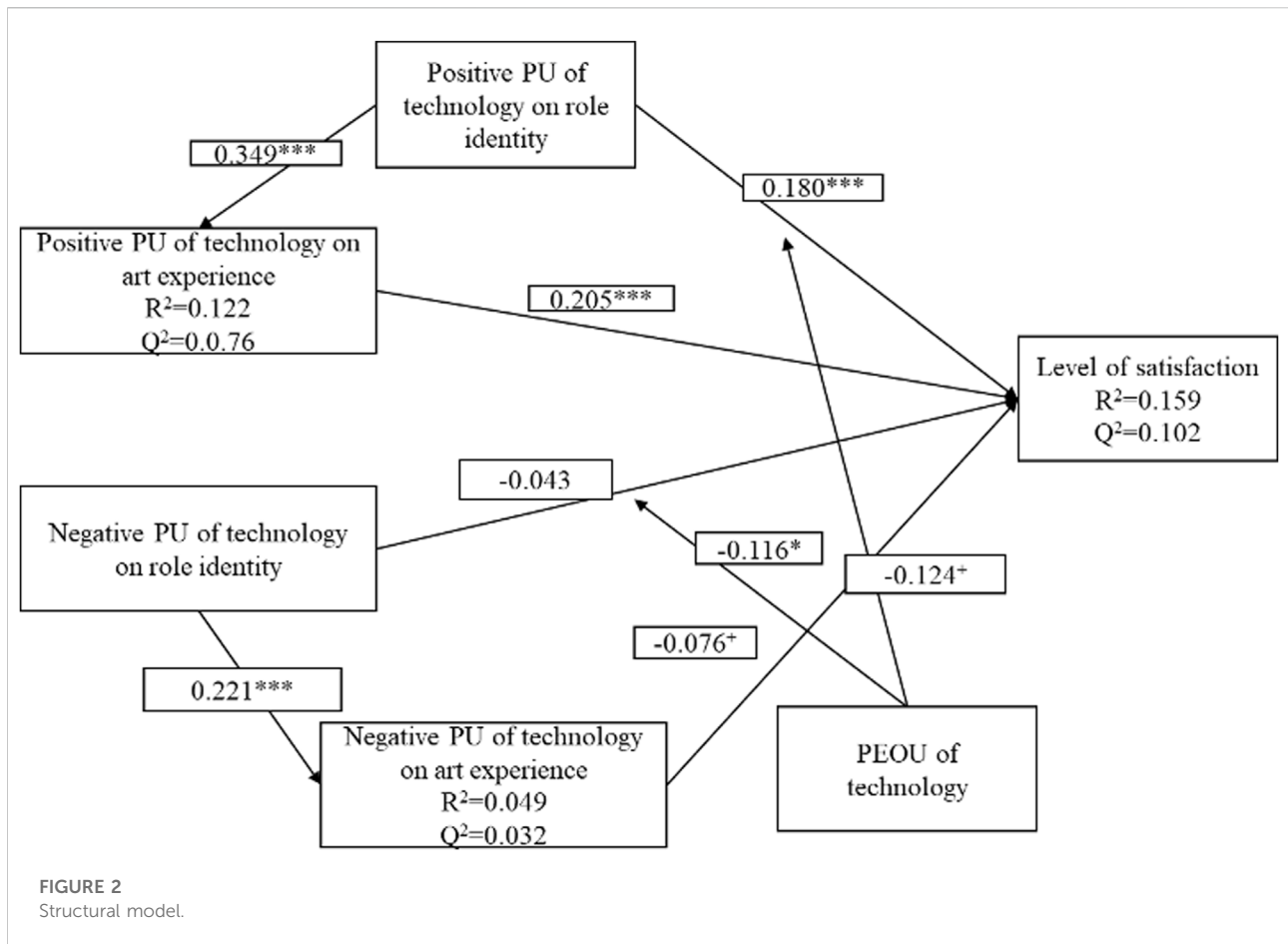
TABLE 4 Heterotrait-monotrait (HTMT).

	Negative perception of the utility of technology on cultural experience	Positive perception of the utility of technology on cultural experience	Negative perception of the utility of technology on role identity	Positive perception of the utility of technology on role identity	Perceived ease of use of technology	Level of satisfaction
Negative perception of the utility of technology on cultural experience						
Positive perception of the utility of technology on cultural experience	0.483					
Negative perception of the utility of technology on role identity	0.255	0.113				
Positive perception of the utility of technology on role identity	0.209	0.441	0.401			
Perceived ease of use of technology	0.089	0.027	0.055	0.023		
Level of satisfaction	0.191	0.324	0.146	0.318	0.047	

TABLE 5 Structural estimates (hypotheses testing).

Hypothesis	Description	Beta	T-value	F Square	Decision
H1a	Positive perception of the utility of technology on cultural experience -> Level of satisfaction	0.205***	3.723	0.137	Supported
H1b	Negative perception of the utility of technology on cultural experience -> Level of satisfaction	−0.076+	1.334	0.105	Supported
H1a	Positive perception of the utility of technology on role identity -> Level of satisfaction	0.18***	3.362	0.132	Supported
H1b	Negative perception of the utility of technology on role identity -> Level of satisfaction	−0.043	0.802	0.102	Not supported
H2a	Positive perception of the utility of technology on role identity -> Positive perception of the utility of technology on cultural experience	0.349***	7.350	0.139	Supported
H2b	Negative perception of the utility of technology on role identity -> Negative perception of the utility of technology on cultural experience	0.221***	4.288	0.151	Supported
H3a	Perceived ease of use of technology X Positive perception of the utility of technology on role identity -> Level of satisfaction	−0.124+	1.507	0.117	Supported
H3b	Perceived ease of use of technology X Negative perception of the utility of technology on role identity -> Level of satisfaction	−0.116*	1.896	0.115	Supported
	Perceived ease of use of technology -> Level of satisfaction	0.058+	1.370	0.104	Moderator

+$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

FIGURE 2
Structural model.

the redefinition of tour guides' roles in the cultural sector. However, it does make the cultural experience more unrealistic, superficial, distracting, and less interesting.

On the other hand, those who are more techno-fan report extremely positive outcomes from adopting digital technology, resulting in enhanced cultural experiences. Indeed, the perception of the utility of technology on role identity has a positive effect on tour guide satisfaction. Furthermore, the perception of the utility of technology in reshaping tour guides' role identities has a positive impact on the perception of the utility of technology on cultural experiences, which, in turn, increases tour guides' level of satisfaction while providing cultural experiences with new technologies. This means that some tour guides believe that technology not only helps them reinvent, enlarge, and enrich their roles in the industry but also makes cultural experiences more interactive, educational, exciting, and fascinating.

Additionally, this study seeks to broaden our understanding of the TAM by positing that the perceived ease of use of technology may act as a moderator when the perception of the utility of technology is examined through the lens of sensemaking principles. Indeed, the findings show that when technology is much more complex, the impact of positive

perception of the utility of technology on role identity in fostering the level of satisfaction is stronger. This is because those with a positive attitude toward technology and its impact on the redefinition of their role are more motivated to use complex technologies because they believe that this process will lead to an increase in their skills and a better redefinition of their own role in the industry. Similarly, when technology is much easier to use, the impact of a negative perception of the utility on role identity in reducing satisfaction is stronger. Those who feel threatened by technology in terms of role redefinition naturally tend not to use technology because they do not perceive the positive aspects. When forced to use them, however, they prefer the simpler ones, which in any case do not increase, but rather decrease, their level of satisfaction.

Managerial and practical implications

Building on the insights provided by this study, marketers and managers, especially within the cultural tourism sector, can derive significant value from understanding how digital technologies reshape consumer experiences and expectations. By recognizing the positive attitudes of professionals, such as tour

FIGURE 3
Moderation effect PEOU of technology x Positive PU of technology on role identity.
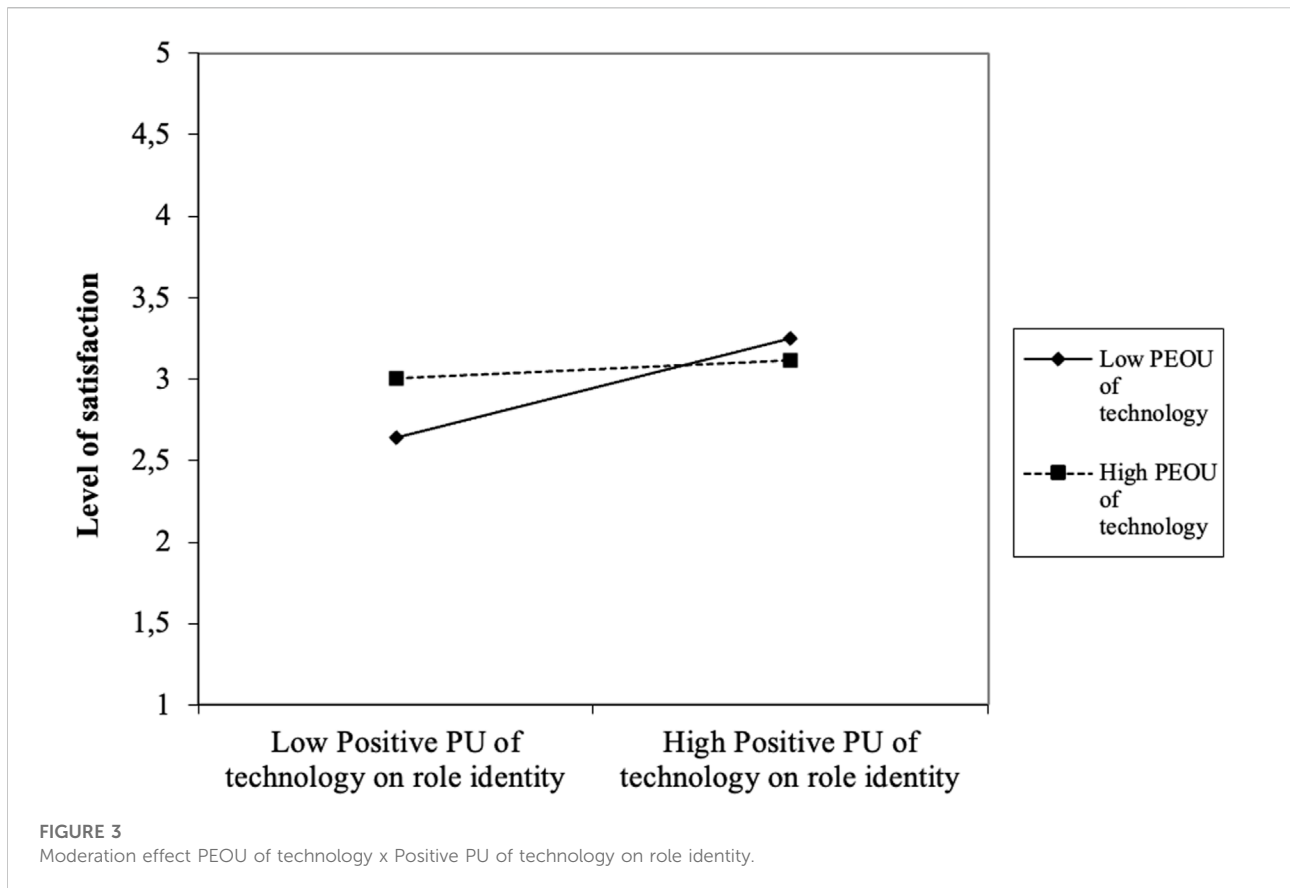
guides, towards technological advancements, marketers can better tailor their strategies to leverage these technologies for enhancing visitor engagement and satisfaction. This approach not only appeals to a broad consumer segment but also addresses the nuanced needs and preferences of specific tourist demographics seeking enriched cultural experiences.

The evidence presented in our research underscores the importance of investing in the technological upskilling of personnel within cultural organizations. Such investments can significantly improve the overall quality of the visitor experience, making these destinations more appealing to a diverse range of tourists. For marketers, this means an opportunity to differentiate their offerings and create more personalized, interactive, and memorable experiences that cater to various consumer segments, including those particularly interested in cultural and historical tourism.

Moreover, by integrating digital technologies into their marketing strategies, cultural organizations can extend their reach and more effectively communicate the value of their offerings to potential visitors. This includes the use of virtual reality tours, augmented reality applications, and interactive guides that enrich the visitor experience and provide a unique competitive edge. As digitalization continues to evolve, understanding its implications enables marketers and

managers to not only enhance the appeal of their cultural assets but also to drive broader organizational change, ensuring that their institutions remain relevant and engaging in a rapidly changing digital landscape.

Lastly, policymakers and cultural institution administrators may find our research useful in redefining conventional roles and models in the cultural context. Because digitalization is irreversible and is becoming increasingly ubiquitous, public and private actors should pay close attention to the implementation of change by taking more proactive roles as change agents.

Limitations and further research

While our research sheds light on the intricate role of satisfaction within the tourism sector, we acknowledge as a limitation our failure to incorporate the consideration of behavioural responses, such as the intention to use, which naturally align with the constructs of PEOU and PU. This oversight is significant given the intrinsic link between these constructs and user behaviour in the context of technology adoption and utilization. However, this acknowledgment aligns with the scholarly discourse on the significance of

FIGURE 4
Moderation effect PEOU of technology x Negative PU of technology on role identity.
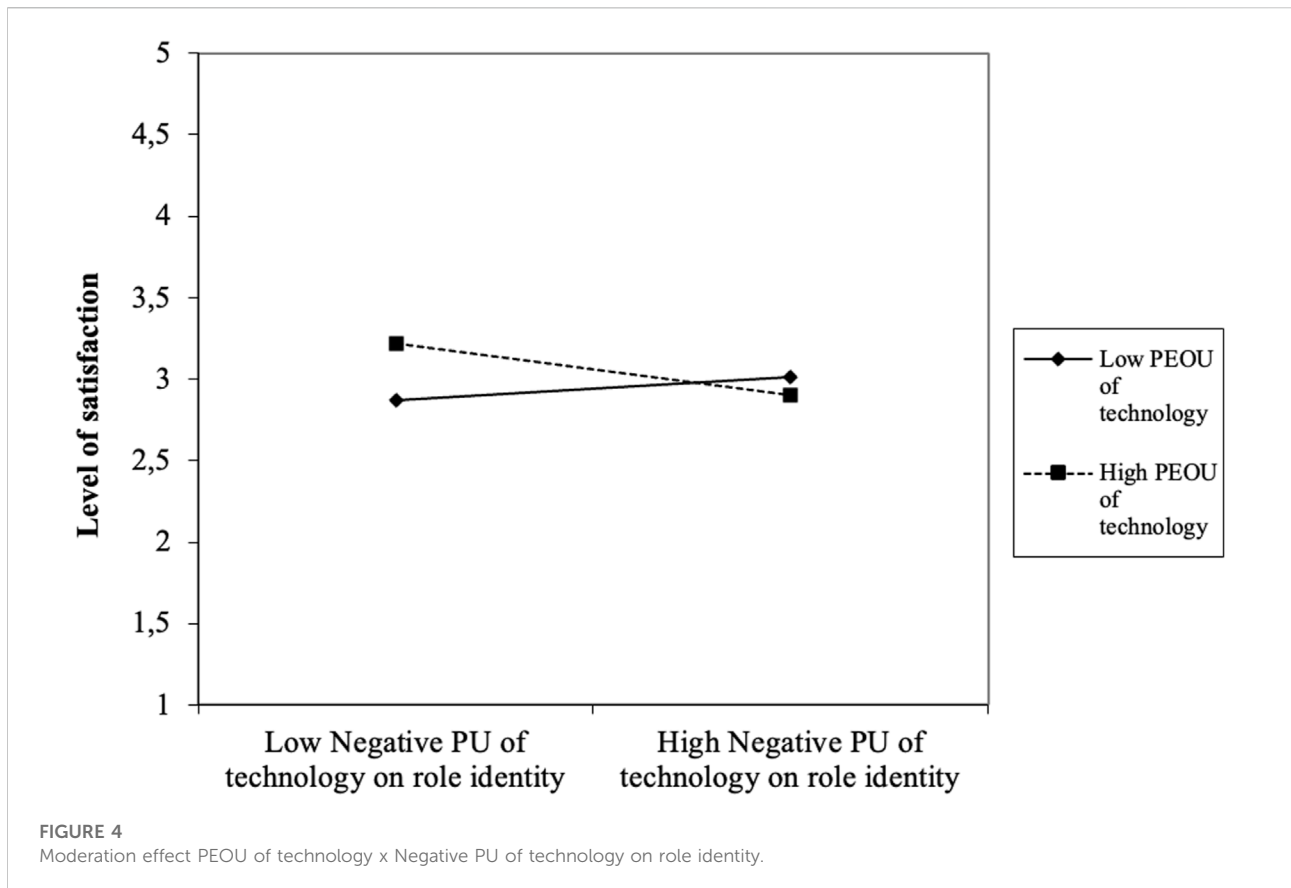
satisfaction within tourism research, as evidenced by other works such as those by Pai et al. (2020) and Lee and Mills (2007).

In extending the scope of our discussion on limitations, it is pertinent to highlight the cross-sectional nature of our methodology. This approach, while insightful, limits our ability to capture the dynamic evolution of attitudes and behaviours over time. Consequently, we advocate for future investigations to adopt longitudinal or experimental designs. Such methodologies would enable the direct observation of changes in tour guides' attitudes and behaviours throughout and following the visitor experience, thereby enriching our understanding of these dynamics.

Additionally, our study's geographical focus on Italy poses constraints on the universality of our findings. The unique cultural, museum, arts, and historical landscape of Italy may not mirror those of other countries with rich cultural offerings. This limitation opens avenues for future research to replicate and extend our study in diverse cultural settings, thereby testing the robustness and applicability of our proposed model across different global contexts.

Lastly, we continue to observe a trend indicating a diminishing negative attitude towards technology among tour guides over time. This shift is largely attributed to the arrival of new generations of tour guides who have been born into an era of technology and are

inherently more comfortable and familiar with digital tools. This change suggests that future studies should not only explore additional variables that elucidate the connections between tour guide satisfaction, the perceived utility of technology, and its ease of use but also consider the evolving perceptions of technology within this group. Investigating how these changing attitudes impact the adoption and satisfaction with technology in the tourism sector could offer valuable insights.

Data availability statement

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

Ethics statement

Due to the nature of this study, direct oversight by an institutional or national research ethics committee was not applicable. However, the research design and conduct were carefully considered to ensure they aligned with the ethical principles outlined in the 1964 Declaration of Helsinki and its later amendments, or comparable ethical standards. All

procedures performed were designed to ensure the utmost respect for participant rights and well-being, emphasizing informed consent, confidentiality, and the right to withdraw without penalty.

Author contributions

Although authors contributed equally, section theory is attributed to LM, results section is attributed to LN, discussion is attributed to LP. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix

A1. Items of the questionnaire.

Negative perception about the utility of technology on cultural experience.

Technological devices limit the visit to the owners of the devices.

Technological devices demotivate art enthusiasts.

Technological devices demotivate people who do not own a personal device.

Technological devices alienate visitors from the external context.

Positive perception about the utility of technology on cultural experience.

Technological devices increase the likelihood to visit a museum or an archaeological site.

Technological devices make the visit more stimulating.

Technological devices make the visit more involving.

Technological devices make the visit more educational.

Negative perception about the utility of technology on the tour guide role identity.

Technology downsized your professional role.

Technology restricted the tour guide's role as a mere support during the cultural experience.

Technology made the role of the tour guide unnecessary.

Positive perception about the utility of technology on the tour guide role identity.

Technology enlarged the spectre of your competencies.

Technology reinvented the role of the tour guide.

Technology enriched the role of the tour guide.

Perceived ease of use of technology.

My interaction with technological devices is clear and understandable.

I would find technological devices to be flexible to interact with.

I would find easy to several technological devices to do what I want to do.

Learning to operate with technological devices would be easy for me.

I would find technological devices easy to use in my daily routine.

Level of satisfaction.

Given my experience with technology, I would like to use it again in my daily activities.

I am satisfied by the usage of technology in my work.

Using technological devices increases my productivity.

I predict that I will continue to use technological devices in the future.