Human-cantered approaches to technology, a review within a tourism context

Anne-Sofie Engelschiøn
University of Stavanger, Norway
anne-sofie.engelschion@uis.no

Truls Engström
University of Stavanger, Norway

Purpose: This paper explores how human-centered approaches to technology are defined and applied with tourism as an illustrative case, yet with implications for management, organizational learning, and innovation across sectors, identifying ways to enhance stakeholder value and human experience beyond profit-driven aims.

Methodology: A systematic literature review following PRISMA analyzed peer-reviewed articles from multidisciplinary and tourism-specific databases. Studies meeting inclusion criteria were thematically reviewed to map definitions, applications, and limitations.

Findings: Human-centered approaches are inconsistently defined in tourism literature and are often limited to usability and interface design. Broader socio-political and systemic dimensions, rooted in the concept's historical development, are less considered. The lack of operational measures and shared vocabulary restricts comparability and knowledge integration. Yet, opportunities remain to embed human-centered principles in co-creation, stakeholder empowerment, and ethical technology integration within tourism ecosystems.

Originality: This is the first systematic review connecting tourism's use of human-centered approaches with their theoretical and historical foundations, offering pathways for more sustainable, ethical, and human-centered innovation. This review addresses current challenges in management and organizational learning by clarifying the fragmented discourse on human-centered approaches and showing how these perspectives can foster innovation and entrepreneurship in tourism and comparable service-oriented organizations.

Introduction

Digital technologies now permeate nearly all aspects of life, from work and leisure to politics. While Werthner (2022b) describes IT as the "global operating system of our society", It could be argued that capitalism functions as its processor. This dynamic is especially evident in the digital age through surveillance capitalism, where human experience is commodified for data extraction and behavioral prediction (Zuboff, 2019).

Policy initiatives increasingly stress that technology must advance societal well-being alongside growth. The European Commission's *Industry 5.0* report calls for resilient, sustainable, and human-centered industry (Breque et al., 2021). In tourism, COVID-19 highlighted the need for resilience and sparked interest in regenerative tourism, which restores ecosystems and communities (Bellato & Pollock, 2023). Alternative and community-centered approaches further emphasize cultural and environmental well-being over profit (Cave & Dredge, 2021). The Digital Humanism initiative similarly reflects concern for digitization's impact on humans and society (Werthner, 2022a).

Tourism has been transformed by digital tools that enhance innovation, efficiency, and experiences (Buhalis & Foerste, 2015). Yet adoption often assumes benefits for tourists without questioning wider impacts (Stankov & Gretzel, 2020). Researchers now highlight risks as well as benefits (Fuchs & Sigala, 2021; Inversini, 2024), calling for deeper inquiry into ethical and sociopolitical issues, particularly regarding well-being (Gretzel et al., 2020).

"Human-centered" approaches contrast with capitalist orientations by emphasizing ethical design, transparency, and empowerment (Polanco-Diges et al., 2022). Surveillance capitalism influences tourism as much as other sectors, yet frameworks to assess human interests online are lacking (Clarke, 2019). Empirical research on tourism's digital transformation remains scarce, and strategies to align technologies with human-centered ideals are underdeveloped (Gretzel et al., 2020). This is particularly relevant for enterprises in tourism, and more broadly in organizations facing rapid digital transformation, where entrepreneurial ventures and organizational learning processes depend on aligning technological innovation with human purpose and community value creation.

This paper contributes by clarifying how human-centered perspectives can inform tourism research, business practices and innovation by critically examining technology's role beyond profit-driven narratives. Specifically, it aims to: (1) examine the discourse on Human-centeredness in tourism, (2) synthesize critical misunderstandings, and (3) guide future research.

Literature review

Mestheme defines technology;

> *"...as the organization of knowledge for the achievement of practical purposes."*(Mesthene, 1970, p. 25)

A broad view encompassing both tools and intangible processes. Technological mediation builds on this, emphasizing that technology actively shapes human perception and social realities rather than functioning as a neutral tool (Ellul, 1980; Ihde, 1990). This perspective highlights the reciprocal shaping of humans and technology, where meanings and uses vary by context (Bijker et al., 2012).

Recognizing technology as mediator raises ethical responsibilities for designers and industry. It underscores how design decisions directly influence human experiences and societal outcomes. Viewing technology as a mediator highlights its role in shaping organizational knowledge flows, managerial decision-making, and opportunities for business innovation and entrepreneurship.

A critical view

Human-centric approaches foreground the ethical and sociopolitical implications of technology, emphasizing human experience. They first emerged through visions of human–computer symbiosis, where humans set goals and interpreted results while machines processed data (Licklider, 1960). At the same time, the concept developed as a critique of societal structures, highlighting human needs, creativity, and agency (Gill, 1996b; Rasmussen, 2007). Gill's definition captures this emancipatory perspective:

"Human centeredness expounds an emancipatory tradition which places human needs, purpose, skill, creativity, and human potential at the center of activities of human organizations and the design of technological systems" (Gill, 1996a, p. 110).

Over time, the concept narrowed toward usability and interface design, reflected in the ISO standard's emphasis on making interactive systems more usable (Standardization, 2019). As a result, contemporary applications tend to reduce human-centricity to interface and usability issues rather than systemic or sociopolitical concerns (Polanco-Diges et al., 2022). For example, human-centered design may improve user interfaces without influencing value creation at the strategic level, reducing "human-centric" to a label (Ystgaard et al., 2023). Even when users are involved, their input is predefined, limiting creative control and transformative outcomes (Catarci et al., 2020).

Surveillance capitalism, as coined by Zuboff (2019), is an economic system that treats human experience as raw material for data extraction. Behavioral data are turned into predictive products to forecast and influence actions, concentrating power in a few corporations (Zuboff, 2019). Surveillance capitalism creates alignment issues by prioritizing data extraction and profit over user autonomy and well-being. It also produces restricted environments, where personalization and algorithmic nudging limit diversity and choice, steering users into predictable, commercially advantageous pathways. Autonomy implies acting in line with personal goals and values, but choices shaped by addiction or manipulation cannot be considered free (Shell, 2009). Regulations such as GDPR, while obstructive in a business-centered model, enhance value creation in a human-centered one. Gill's (1996) emancipatory framing situates human-centricity within a critical tradition that interrogates power, inequality, and bias.

The tourism context

Tourism has unique advantages. 94% of European firms are micro-enterprises, travelers seek personalized experiences, and destinations depend on collaboration across providers (Buhalis & Sinarta, 2019; Stickdorn et al., 2014), effective interoperability is therefore critical (Gritta & Calabrese, 2023).

Historically, access to advanced technologies has required significant capital investment. In the tourism industry, much technological development is led by major providers whose solutions often misalign with the needs of smaller actors and travelers (Stankov & Gretzel, 2021). Platform technologies, presents additional risks when only large actors have the capital to develop and own technology (Tuomi & Passos Ascencao, 2023; Yang & Zhang, 2023). This neglect is even more pronounced in informal value creation activities (Gibson-Graham, 2003). The growing use of AI is likely to intensify these challenges. Alverti et al. (2018) illustrates the potential for technology to generate societal impact that extends beyond conventional economic frameworks in tourism.

Tourism professionals mainly use technology for data storage and retrieval, not collaborative production revealing a gap in both available tools and industry awareness (Sigala & Chalkiti, 2014). The tools available are mainly for businesses rather than for individuals to collaborate and share information (Yuan et al., 2019). Yet, research shows that empowering travelers with tools to contribute data yields richer insights than conventional methods (Stickdorn et al., 2014).

These dynamics highlight both the risks of business-centered technology and the opportunities for human-centered innovation.

Method

To gain a comprehensive understanding of the concept of human-centric approaches and their application within the field of tourism, a systematic review was conducted. Following best practices we applied PRISMA and documented procedures and decisions, to enhance the rigor and transparency of the research (Pahlevan-Sharif et al., 2019; Shamseer et al., 2015).

The search covered Web of Science, Academic Search Premier (EBSCO), and Hospitality & Tourism Complete. Web of Science was included for its multidisciplinary scope and rigorous indexing, capturing research from fields such as human-computer interaction, design, and management. Hospitality & Tourism Complete ensured coverage of core tourism and hospitality journals, while Academic Search Premier broadened the scope to adjacent disciplines such as sociology, communication, and information systems. Other databases were considered, but the selected combination provided the most relevant balance of breadth and domain specificity.

Search strategies were developed in consultation with a librarian. The search string *"Human-centric"* OR "User-centric*" OR "Consumer-centric*" OR "Customer-centric*" AND Tourism OR Hospitality OR Service industry* was applied to titles, keywords, and abstracts. Related terms (user, consumer, customer, tourist-centric) were included to ensure comprehensive coverage, and a citation search was conducted as a supplement (Akerjordet et al., 2018).

Inclusion criteria required a clear link to human-centered approaches in tourism. Only English-language, peer-reviewed, full-length journal articles were considered. Editorials, conference materials, book reviews, abstracts, and internet sources were excluded due to limited scholarly contribution (Mehraliyev et al., 2019). Additionally, only peer reviewed articles that were published in journals which was ranked 1 or 2 in the Norwegian Register[1] were included. To ensure rigor and relevance, only articles meeting these standards were included (Ye et al., 2020). The review covered publications from 1960 to August 2024 to capture the evolution of human-centered discourse in tourism.

Data was extracted, organized, categorized, and summarized using Excel. Providing an integrated matrix. Two reviewers extracted data independently. In cases of disagreement, the reviewers deliberated until consensus.

[1] Search in Norwegian List | Norwegian Register (hkdir.no)

Results

The screening yielded 89 records, of which full texts were reviewed for eligibility. Several studies were excluded due to lack of relevance. Citation searches identified 7 additional papers, bringing the final sample to 62 (Figure 1). See the full list of included articles in Appendix 1.
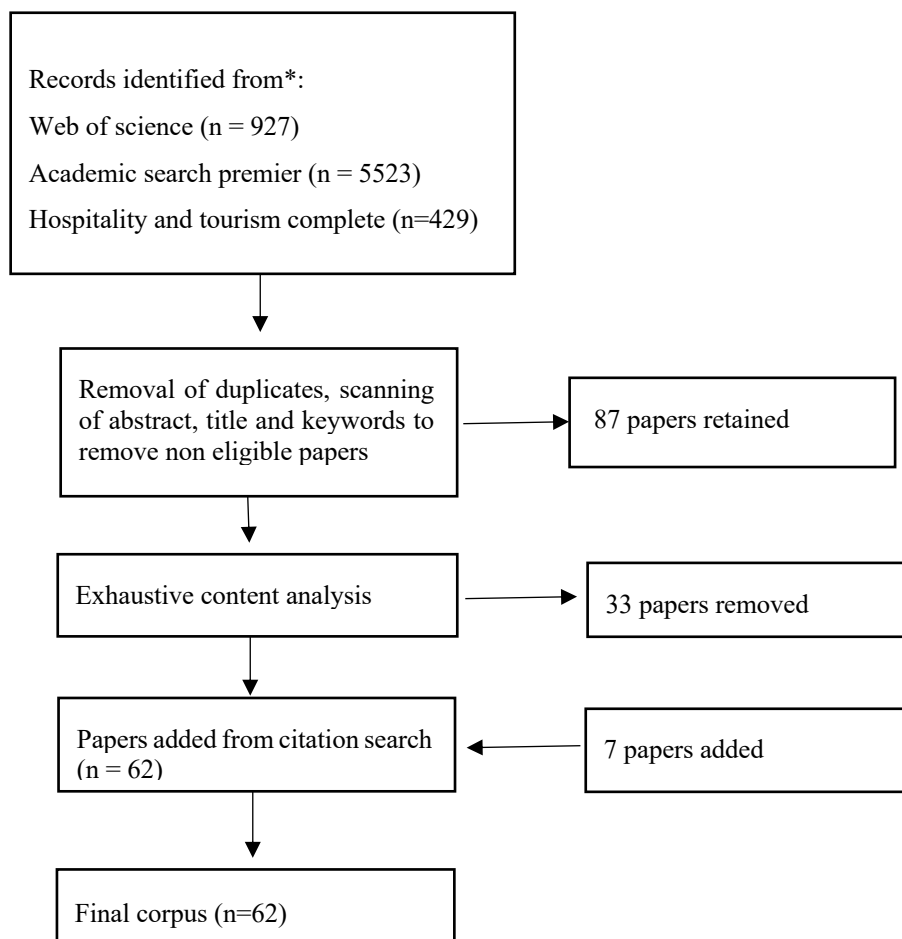

Figure 1: Article selection process

Results show that scholarly attention to human-centric approaches in tourism is recent, with the first mention in 2003 and most publications appearing after 2019. This growth indicates rising recognition of the value of a human-centric perspective in tourism (Figure 2).
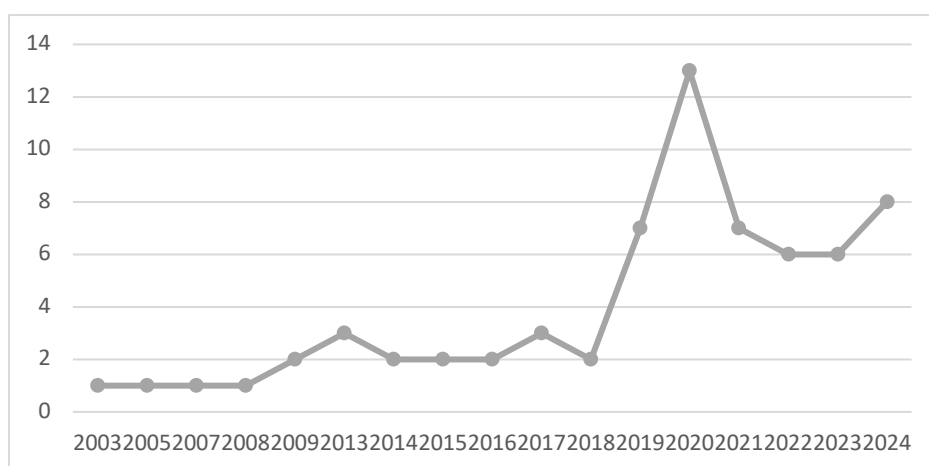
Figure 2: Reviewed articles by publication year (Appendix 1)

Researchers in the tourism domain have adopted different interpretations of human-centeredness, with some focusing on design aspects such as usability, interaction, and design itself (Han, 2019; Pioppi et al., 2020). Others employ a broader interpretation that includes considerations of decent work (Ioannides et al., 2021), well-being (Stankov & Gretzel, 2021), sustainability (Butowski, 2021; Timur & Timur, 2016; Weaver et al., 2022), and societal transformation (Alford & Clarke, 2009; McNaughton et al., 2020). Marketing is a recurring context where consumer-centric discourses stress customization, personalization, and interactivity (Buhalis & Sinarta, 2019; So et al., 2021). Note that these terms are often mentioned only in passing rather than applied as theoretical frameworks or central research elements.
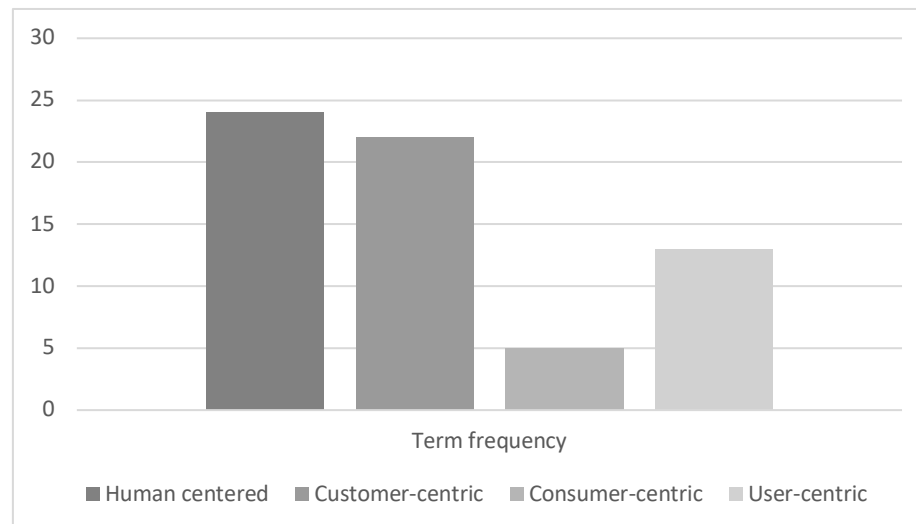
Figure 3: Frequency of terms (Appendix 1)

Our corpus is published predominantly by UK- and Netherlands-based houses, led by Taylor & Francis/Routledge and Emerald (UK) and Elsevier (Netherlands), with additional concentration in Switzerland (MDPI), Germany (Springer Nature; Ergon/Nomos), and the USA (Wiley; SAGE). This distribution signals a clear European–Anglophone tilt in the outlets shaping the human-centered technology discourse in tourism.

Across the 62 articles, the author pool is dominated by Europe, East Asia, and North America. Many prolific contributors are Europe-based (e.g., UK, the Nordics, Germany, Italy), East Asian scholarship, especially from Hong Kong/China and South Korea is also prominent, with additional but more modest contributions from Southern Africa and the Middle East. Overall, the national distribution mirrors the field's current centers of gravity: European policy and theory leadership (digital humanism/Industry 5.0), East Asian design and data-driven approaches, and North American conceptual and analytics streams, with limited representation from the Global South outside a handful of cases. Within this landscape, Dimitrios Buhalis stands out as the most prolific author, though his work primarily addresses interface-level issues of efficiency, marketing, and connectivity, with less attention to ethics or power. In contrast, Ulrike Gretzel emerges as a leading critical voice, interrogating the social, ethical, and political implications of digital innovation, moving beyond celebratory accounts of progress. Her analyses highlight the risks of uncritical adoption, calling attention to surveillance, responsibility, and broader human-centered concerns, making her a strong advocate for a critical interpretation of the human-centered perspective.

Discussion

This review shows that human-centered approaches in tourism remain fragmented and underdeveloped. Definitions vary, applications are inconsistent, and terminology is used in different and sometimes contradictory ways, limiting cumulative knowledge. This lack of conceptual clarity also constrains managers and entrepreneurs in tourism from leveraging human-centered approaches to guide innovation, organizational learning, and strategic development. Establishing a shared framework and vocabulary is critical to advance the field (Bergkvist & Eisend, 2021).

Within the literature, two main interpretations of human-centricity emerge. One examines the relationship between technology and society, emphasizing impacts and ethics (Alverti et al., 2018). The other reduces human-centeredness to usability or customer-centricity, often serving marketing purposes (Niininen et al., 2007). This narrowing constrains inquiry to optimizing pre-defined user journeys, rather than asking whether technologies are necessary or desirable.

The review revealed overlapping terms such as user-centric, consumer-centric, consumer-centric and human-centric design (HCD), all emphasizing how technology can enhance users' needs or experience. However, this framing narrows inquiry, often avoiding critical questions such as whether the individual wish to be users or if technology should be implemented at all. It also tends to exclude non-users and communities affected by new systems.

In tourism, proposed benefits of human-centric approaches include efficiency, better user experiences, trust-building, and increased sustainability (Buhalis & Sinarta, 2019; McNaughton et al., 2020; So et al., 2021). Yet, as empirical evidence remains limited, and infrastructure often lags (Stankov & Gretzel, 2021), more research is needed to test these claims.

As described in the Literature Review, the persistent misalignment between available technological solutions and the needs of tourism stakeholders, suggests that without deliberate choices, technology adoption will continue to reproduce existing inequalities. Platform centralization and the capital-intensive nature of emerging technologies like AI risk excluding smaller actors and limiting diversity in innovation. Industry practitioners and policymakers could explore cooperative platforms, community-owned data infrastructures, and participatory processes that embed human-centered principles into the technological foundations of tourism.

Encouraging diverse forms of participation particularly those that allow for more private or localized interactions could help capture richer, more representative insights into tourist experiences, as demonstrated in studies using individual data collection tools (Stickdorn et al., 2014). Future research and development efforts should target technologies that support knowledge sharing, collaboration, and creative participation across the tourism ecosystem. alternative approaches to technology design and ownership can foster more inclusive and sustainable tourism systems.

This study faces limitations, including potential thematic gaps, author bias, and challenges of replicability due to evolving search technologies. It also contributes little empirical evidence, underlining the need for further research.

Conclusion

Digital humanism and Industry 5.0 highlight the need for theories and frameworks that critically assess technologies in tourism. Yet diverse interpretations of human-centricity hinder a shared understanding. This paper calls for a return to its historical, emancipatory roots as a guiding principle. More empirical studies are required to examine how organizations can embed human-centered approaches into management strategies, entrepreneurial practices, and innovation processes that connect technology, infrastructure, and human experience.

A human-centered lens can inform technologies and infrastructures that genuinely serve individuals and communities, fostering connection, equity, and sustainability. The review shows that discourse on human-centricity in tourism is still nascent, with inconsistent terminology. Key areas constrained by a business-centered logic include autonomy, networked value, and co-creation, all requiring further study. For entrepreneurs and business leaders, adopting a systemic human-centered approach can unlock new forms of value creation while addressing organizational learning challenges in rapidly changing environments.

Despite challenges from surveillance capitalism, there are opportunities to reimagine the digital landscape through co-creation, agency, and enriched experiences. These remain largely untapped, offering space for creative advancement. While this review is situated in tourism, the conceptual arguments regarding human-centered approaches are relevant to a wider set of industries and organizations confronting similar challenges of digital innovation, management, and organizational learning.

Further research suggestions

- Theorize the IT artefact in a human-centered paradigm.
- Identify features of non-human-centered systems.
- Conduct case studies of tourism technologies using a human-centered lens.
- Examine gaps between technology-supported networked value and co-creation.
- Assess human-centered responses to alignment problems posed by AI.

References

Akerjordet, K., Furunes, T., & Haver, A. (2018). Health-promoting leadership: An integrative review and future research agenda. *Journal of advanced nursing*, *74*(7), 1505-1516. https://doi.org/10.1111/jan.13567

Alford, P., & Clarke, S. (2009). Information technology and tourism a theoretical critique. *Technovation*, *29*(9), 580-587. https://doi.org/10.1016/j.technovation.2009.05.006

Alverti, M. N., Themistocleous, K., Kyriakidis, P. C., & Hadjimitsis, D. G. (2018). A Human Centric Approach on the Analysis of the Smart City Concept: the case study of the Limassol city in Cyprus. *Advances in Geosciences*, *45*, 305-320.

Bellato, L., & Pollock, A. (2023). Regenerative tourism: a state-of-the-art review. *Tourism Geographies*, *27*(3-4), 558-567. https://doi.org/10.1080/14616688.2023.2294366

Bergkvist, L., & Eisend, M. (2021). The dynamic nature of marketing constructs. *Journal of the Academy of marketing Science*, *49*, 521-541.

Bijker, W. E., Hughes, T. P., & Pinch, T. (2012). *The social construction of technological systems, anniversary edition: New directions in the sociology and history of technology*. MIT press.

Breque, M., De Nul, L., & Petridis, A. (2021). *Industry 5.0 : towards a sustainable, human-centric and resilient European industry*. P. O. o. t. E. Union. https://data.europa.eu/doi/10.2777/308407

Buhalis, D., & Foerste, M. (2015). SoCoMo marketing for travel and tourism: Empowering co-creation of value. *Journal of destination marketing & management*, *4*(3), 151-161. https://doi.org/10.1016/j.jdmm.2015.04.001

Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing*, *36*(5), 563-582.

Butowski, L. (2021). Sustainable tourism: a human-centered approach. *Sustainability*, *13*(4), 1835. https://doi.org/10.3390/su13041835

Catarci, T., Marrella, A., Santucci, G., Sharf, M., Vitaletti, A., Di Lucchio, L., Imbesi, L., & Malakuczi, V. (2020). From Consensus to Innovation. Evolving Towards Crowd-based User-Centered Design. *International Journal of Human–Computer Interaction*, *36*(15), 1460-1475. https://doi.org/10.1080/10447318.2020.1753333

Cave, J., & Dredge, D. (2021). Regenerative tourism needs diverse economic practices. In *Global Tourism and COVID-19* (pp. 49-59). Routledge.

Clarke, R. (2019). Risks inherent in the digital surveillance economy: A research agenda. *Journal of information technology*, *34*(1), 59-80.

Ellul, J. (1980). *Technological System*. The Continuum Publishing Corporation.

Fuchs, M., & Sigala, M. (2021). Strategic use of information technologies in tourism: A review and critique. *Handbook of e-Tourism*, 1-37. https://link.springer.com/referenceworkentry/10.1007/978-3-030-05324-6_67-1

Gibson-Graham, J. K. (2003). An ethics of the local. *Rethinking Marxism*, *15*(1), 49-74.

Gill, K. S. (1996a). The foundations of human-centred systems. In *Human machine symbiosis* (pp. 1-68). Springer, London

Gill, K. S. (1996b). The human-centred movement: the British context. *Ai & Society*, *10*, 109-126.

Gretzel, U., Fuchs, M., Baggio, R., Hoepken, W., Law, R., Neidhardt, J., Pesonen, J., Zanker, M., & Xiang, Z. (2020). e-Tourism beyond COVID-19: a call for transformative research. *Information Technology & Tourism*, *22*, 187-203. https://link.springer.com/article/10.1007/s40558-020-00181-3

Gritta, F., & Calabrese, M. (2023). Internet use in small tourism in Italy: what will be the role of local government? *Transforming Government: People, Process and Policy*, *17*(4), 632-654.

Han, D.-I. D. (2019). Calling for user-centric VR design research in hospitality and tourism. *Hospitality & Society*, *9*(2), 237-246. https://doi.org/https://doi.org/10.1386/hosp.9.2.237_7

Ihde, D. (1990). Technology and the lifeworld: From garden to earth.

Inversini, A. (2024). Human centered digital transformation in travel: a horizon 2050 paper. *Tourism Review*, *80*(1), 326-337. https://doi.org/10.1108/TR-12-2023-0886

Ioannides, D., Gyimóthy, S., & James, L. (2021). From liminal labor to decent work: A human-centered perspective on sustainable tourism employment. *Sustainability*, *13*(2), 851.

Licklider, J. C. (1960). Man-computer symbiosis. *IRE transactions on human factors in electronics*, *7*(1), 4-11.

McNaughton, M., Rao, L., & Verma, S. (2020). Building smart communities for sustainable development:: Community tourism in Treasure Beach Jamaica. *Worldwide Hospitality and Tourism Themes*, *12*(3), 337-352.

Mehraliyev, F., Choi, Y., & Köseoglu, M. A. (2019). Progress on smart tourism research. *Journal of Hospitality and Tourism Technology*, *10*(4), 522-538.

Mesthene, E. G. (1970). Technological change: Its impact on man and society.

Niininen, O., Buhalis, D., & March, R. (2007). Customer empowerment in tourism through consumer centric marketing (CCM). *Qualitative Market Research: An International Journal*, *10*(3), 265-281. https://doi.org/10.1108/13522750710754308

Pahlevan-Sharif, S., Mura, P., & Wijesinghe, S. N. (2019). A systematic review of systematic reviews in tourism. *Journal of Hospitality and Tourism Management*, *39*, 158-165.

Pioppi, B., Pigliautile, I., Piselli, C., & Pisello, A. L. (2020). Cultural heritage microclimate change: Human-centric approach to experimentally investigate intra-urban overheating and numerically assess foreseen future scenarios impact. *Science of the Total Environment*, *703*, 134448.

Polanco-Diges, L., Saura, J. R., & Pinto, P. (2022). Setting the Relationship between Human-Centered Approaches and Users' Digital Well-being: A Review. *Journal of Tourism, Sustainability and Well-being*, *10*(3), 148-171.

Rasmussen, L. B. (2007). From human-centred to human-context centred approach: looking back over 'the hills', what has been gained and lost? *Ai & Society*, *21*, 471-495.

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *Bmj*, *349*. https://doi.org/10.1136/bmj.g7647

Shell, S. M. (2009). *Kant and the Limits of Autonomy*. Harvard university press.

Sigala, M., & Chalkiti, K. (2014). Investigating the exploitation of web 2.0 for knowledge management in the Greek tourism industry: An utilisation–importance analysis. *Computers in Human Behavior*, *30*, 800-812.

So, K. K. F., Wei, W., & Martin, D. (2021). Understanding customer engagement and social media activities in tourism: A latent profile analysis and cross-validation. *Journal of Business Research*, *129*, 474-483.

Standardization, I. (2019). *Ergonomics of human-system Interaction Part 210: Human-centred design for interactive systems* (9241-210:2019). https://www.iso.org/standard/77520.html

Stankov, U., & Gretzel, U. (2020). Tourism 4.0 technologies and tourist experiences: a human-centered design perspective. *Information Technology & Tourism*, *22*(3), 477-488. https://link.springer.com/article/10.1007/s40558-020-00186-y

Stankov, U., & Gretzel, U. (2021). Digital well-being in the tourism domain: mapping new roles and responsibilities. *Information Technology & Tourism*, *23*(1), 5-17. https://link.springer.com/article/10.1007/s40558-021-00197-3

Stickdorn, M., Frischhut, B., & Schmid, J. S. (2014). Mobile ethnography: A pioneering research approach for customer-centered destination management. *Tourism Analysis*, *19*(4), 491-503. https://doi.org/10.3727/108354214X14090817031198

Timur, S., & Timur, A. T. (2016). Employee ownership and sustainable development in tourism: a case in North Cyprus. *Sustainable Development*, *24*(2), 89-100.

Tuomi, A., & Passos Ascencao, M. (2023). Deliberative governance for tourism platforms. *Annals of Tourism Research*, *103*. https://doi.org//10.1016/j.annals.2023.103647

Weaver, D. B., Moyle, B., & McLennan, C.-l. J. (2022). The citizen within: Positioning local residents for sustainable tourism. *Journal of Sustainable Tourism*, *30*(4), 897-914.

Werthner, H. (2022a). A digital humanism view on e-tourism. *Information Technology & Tourism*, *24*(3), 347-360. https://doi.org/10.1007/s40558-022-00237-6

Werthner, H. (2022b). From absolute nonsense to the world's operating system. *Electronic markets*, *32*(1), 145-151.

Yang, J., & Zhang, M. (2023). Beyond structural inequality: a socio-technical approach to the digital divide in the platform environment. *Humanities and Social Sciences Communications*, *10*(1), 1-12.

Ye, B. H., Ye, H., & Law, R. (2020). Systematic review of smart tourism research. *Sustainability*, *12*(8), 3401.

Ystgaard, K. F., Atzori, L., Palma, D., Heegaard, P. E., Bertheussen, L. E., Jensen, M. R., & De Moor, K. (2023). Review of the theory, principles, and design requirements of human-centric Internet of Things (IoT). *Journal of Ambient Intelligence and Humanized Computing*, *14*(3), 2827-2859.

Yuan, Y., Tseng, Y.-H., & Ho, C.-I. (2019). Tourism information technology research trends: 1990-2016. *Tourism Review*, *74*(1), 5-19. https://doi.org/10.1108/TR-08-2017-0128

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.