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Management systems for cultural and creative organizations: A systematic literature review and design agenda

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ABSTRACT

In recent years, technological advancements have driven innovation, modernization and organizational growth across the Cultural and Creative Industries (CCIs). Nonetheless, despite the acknowledged advantages of industry-tailored management systems, their deployment within CCIs has been scarcely investigated. Through a Systematic Literature Review (SLR) guided by the PRISMA protocol, this study (i) evaluates the current utilization of management systems within cultural and creative organizations (CCOs), (ii) identifies CCO-oriented system requirements and design approaches, and (iii) examines advanced technologies for system optimization. In total, this SLR reviewed twenty-three journal articles, published between 2014 and 2024, and ranging across multiple Cultural Domains (UNESCO Institute for Statistics, 2009). A preliminary Bibliometric Analysis was performed on five bibliometric indicators, which supplemented the Results and Analysis section, wherein the findings were synthesized into three primary dimensions - Systems and Functions, System Design, and Intelligent Optimization. The resultant insights prompted the construction of two conceptual frameworks: (i) a Research Trajectories framework, meant to inspire upcoming studies in this research field, and (ii) an innovative Design Agenda, which devises strategic recommendations for new, industry-tailored and CCO-oriented integrated management systems.

1. Introduction

Transversally, technological innovations are transforming the Cultural and Creative Industries (CCIs) (Li, 2020; Ochai, 2022) by empowering new strategies for organizational and market growth (Jones et al., 2016). For instance, the strategic discourses within these industries align with ongoing technological transformations (Todorovic & Bakir, 2016), such as the transition to novel business models, the incorporation of multilayered revenue streams, and the modernization of decision-making practices, enabled by information systems (IS), automation mechanisms and data-driven management (DeFillippi, 2013; Landoni et al., 2020; Li, 2020; Macdonnell & Bereson, 2019). Nevertheless, whereas evolving technologies deliver innovative solutions for CCIs (Macdonnell & Bereson, 2019), literature has shown that the deployment of management systems has remained undetectable and undervalued within cultural and creative organizations (CCOs) (Byrnes, 2009; Hagenhoff, 2016). However, the prospective operationalization of CCO-oriented management systems is predicated upon four industry-convergent characteristics, which fundamentally distinguish them from other industrial landscapes.

Firstly, CCOs are established within the CCIs (European CommissionIzsak, 2021; Salder, 2020), referring to "*industries whose principal purpose is the production or reproduction, promotion, distribution, or commercialization of goods, services, and activities of a cultural, artistic, or heritage value*" (UNESCO & The World Bank, 2021, p.8). Despite proliferous criticism surrounding CCIs' terminologies, conceptualizations and classification systems (Galloway & Dunlop, 2007; Hesmondhalgh, 2019; O'Connor, 2024; Throsby, 2008; UNESCO & UNDP, 2013), the Framework for Cultural Statistics Domains (UNESCO Institute for Statistics, 2009) constitutes an international standard for classifying the Industries' domains (Appendix A), sectorial activities, occupations, goods, and services, all of which are operationalized within CCOs. Collectively, these features underscore the production of the industries' outputs (e.g. museum exhibitions, artistic performances, audiovisual artworks, handcrafted artifacts, literary works, and creative designs) that, albeit their diversity — be physical or digital, static or dynamic, permanent or temporary - transversally share a symbolic significance (UNESCO Institute for Statistics, 2009; Throsby, 2008; UNESCO &

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UNDP, 2013; UNESCO Institute for). Distinct from other industry sectors, CCIs extend beyond profit-driven narratives and economic imperatives, rather embodying social and educational values, promoting social change and inclusivity, and driving sustainable international development (O'Connor, 2024; Hesmondhalgh, 2019; Komorowski & Lewis, 2023; European CommissionIzsak, 2021; Li, 2020; Oyekunle & Sirayi, 2018; UNESCO, 2022; Ernst & Young, 2015).

Secondly, deriving from the preceding argument, CCOs are also characterized by a transversal management complexity, instigated by dichotomic tensions against commodification and commercialization (Hesmondhalgh, 2019; Salder, 2020; Stahl & Tröndle, 2019), which fundamentally differentiates them from other business-oriented organizations. Historically, cultural and creative production has consistently intersected with market dynamics: initially the works were commissioned by patrons, whereas in the nineteenth century these began to reach the public via intermediaries, and from the twentieth century onwards, they were progressively associated with cultural companies (Hesmondhalgh, 2019). This evolution has precipitated ethical debates regarding the industrialization and commodification of culture, questioning whether goods and services should be removed from the market and maintain a public status (Hesmondhalgh, 2019). Moreover, the involvement of private companies has often exerted control over production decisions, privileging profitability, audience satisfaction and mass-market appeal, instead of cultural and artistic self-expression (Germain-Thomas, 2018; Hesmondhalgh, 2019). While these tensions may vary across cultural domains, these pushbacks safeguard autonomy, creativity and innovation against commercial pressures imposed by patrons and regulators (DeVereaux, 2019; Todorovic & Bakir, 2016). Therefore, CCO's management teams are responsible for the "*balance to achieve businesses objectives on one hand and retaining creative integrity on the other hand*" (Holzmann & Mazzini, 2020, p. 2), thereby ethically mediating stakeholders, industry professionals and audiences in a mutually beneficial and inclusive manner (DeVereaux, 2019; Macdonnell & Bereson, 2019; Seidel, 2009; Todorovic & Bakir, 2016).

In parallel, the third industry-convergent characteristic illustrates CCOs' multidimensional organizational environments, which are consistently portrayed as dynamic, experimental, flexible and unpredictable, operating under project-based structures that entail independent and non-repetitive tasks (Alacovska, 2018; Collyer, 2010; DeFillippi, 2013; Holzmann & Mazzini, 2020; Salder, 2020; Seidel, 2009; Stahl & Tröndle, 2019). While these structures may be representative of empowerment, autonomy, and emancipated work models (Hodgson & Briand, 2013), the recurrent absence of formalized, standardized, or automated procedures leads to substantial challenges in strategic planning and performance measuring (Salder, 2020). Furthermore, cultural and creative workplaces are highly informal, often functioning without hierarchies, bureaucracies or schedules (Alacovska, 2018) and impeding traditional methods of control (Hodgson & Briand, 2013). As a result, CCOs experience low reliability and uncertain outcomes (Alacovska, 2018; DeFillippi, 2013; Collyer, 2010), which are worsened by the fluidity and interchangeability of management roles, indivertibly relaying cross-departmental responsibilities to singular individuals (DeVereaux, 2019; Stahl & Tröndle, 2019). Furthermore, the prevalence of interdisciplinary teams, habitually composed by temporary personnel and freelancers, establishes the need for resilient leadership strategies (Bérubé & Gauthier, 2021; Cirella, 2021; DeFillippi, 2013; Holzmann & Mazzini, 2020; Koch et al., 2023; Salder, 2020; Seidel, 2009). All in all, these circumstances foresee the development of new systems that support modern managerial strategies, without constraining individual autonomy and creativity, thereby capturing "*both technical and aesthetic work in this sector*." (Hodgson & Briand, 2013, p. 322).

The fourth industry-convergent characteristic pertains to the structural vulnerabilities of CCOs. Primarily, these institutions are composed by Small and Medium-Sized Enterprises (SMEs) and micro-companies at a national or local level, including non-profit organizations and governmental institutions (European CommissionIzsak, 2021; UNESCO & UNDP, 2013). Their structures are often unkept by unsustainable financial models that predominantly rely on subsidies, patronage, sponsorships, grants, or donations (Salder, 2020; UNESCO & UNDP, 2013). These funding dependencies systemically amplify the preexisting environmental complexities, establishing adverse ramifications, including – (i) high external dependencies; (ii) commercialization and productivity pressures; (iii) temporary and project-based funding, which jeopardize talent retainment and team continuity; (iv) unfamiliarity with the investment industry and investor relations; and (v) job precarity and employment insecurity (Salder, 2020). Simultaneously, informal employment practices remain widespread, encompassing the lack of contractual agreements, "cash-in-hand" payments, unregulated working conditions, and minimal employment protection – altogether perpetuating financial instability, exacerbating job precarity and labour exploitation, and hindering sustainable growth (Alacovska, 2018; Salder, 2020).

Albeit these industry-convergent characteristics, there are inherent variations in technical operations, management practices, and departmental processes amongst industry domains (Li, 2020; Salder, 2020). For instance, organizational activities may circumscribe either traditional or digital productions, or hybridly fluctuate between them (Li, 2020). In fact, industry research has often overgeneralized sectorial insights or subsumed them within broader economic dialogues, prioritizing successful cases whilst neglecting transversal systemic challenges (Salder, 2020).

Hence, both the idiosyncrasies and convergences of CCOs intersect the prospective advantages of industry-tailored management systems, which are designed to coordinate, automate and optimize the business operations, organizational processes, and functional areas of an institution (Hagenhoff, 2016; Laudon & Laudon, 2017; Svejvig, 2013). The most prominent examples include Enterprise Resource Planning System (ERP), Customer Relationship Management Systems (CRM) and Supply-Chain Management Systems (SCM) (Laudon & Laudon, 2017; Svejvig, 2013). In practice, these management solutions are commonly acquired as pre-packaged, off-the-shelf software, originally devised for mass-market distribution. Yet, their modular architectures are often customizable and enable organizations to purchase functional modules, according to their operational and organizational requirements (J. S. Valacich & George, 2020; Hagenhoff, 2016). Furthermore, these softwares can be licensed, executed, updated and maintained remotely, wherein institutions access them via the internet or private virtual networks (J. S. Valacich & George, 2020). In turn, this practice reduces infrastructural costs by eliminating the need for local hardware and in-house software development, while also safeguarding data within a singular repository (J. S. Valacich & George, 2020).

Nonetheless, an examination of the leading providers of management software—SAP and Oracle—reveals that products expressly designed for CCIs are limited, with both vendors restricting their services to Media and Entertainment. For instance, SAP provides a standard ERP, a Rights and Royalty management platform, a ticketing software and an engagement management platform (SAP, n.d.), whereas Oracle markets a Media Production Planning solution and a Talent Management feature (Oracle, n.d.). Although these off-the-shelf systems attend to multiple functional areas of CCOs, they are not designed to accommodate the organizational complexities and informal environments of most institutions, rendering them unsuitable (Wu, 2015). In parallel, the spare implementation of management systems within CCOs (Byrnes, 2009; Hagenhoff, 2016; Salder, 2020) is predominantly attributed to structural constraints, such as limited organizational resources, inadequate technological infrastructures, and lack of executive endorsement (Center for Arts Management and Technology, 2011). Correspondingly, these barriers reflect the recurrent impediments of system implementation, including challenges with data standardization, user resistance, lack of managerial support and misalignment between the organization's requirements and the system's design (Svejvig, 2013).

Amidst these barriers, literature demonstrates an incidence of management systems within CCOs, highlighting three thematical trends. First, previous studies are dispersed across disciplinary domains and research scopes, focusing on fragmented management systems – e.g. Collection Management Systems (CMS) and Digital Asset Management Systems (DAM) for museums (Chapman, 2015; Choi & Fiorino-Iannace, 2018; Norling, 2018) or digital dashboards and CRM for arts institutions (Walter, 2015). This fragmentation not only complicates the internal management of these systems but also motivates the development of integrated management solutions (Laudon & Laudon, 2017). Second, design-oriented studies conducted within CCOs remain inconsistent (Chandra et al., 2015; Gregor et al., 2020), oftentimes neglecting critical features – e.g. technical architecture guidelines, design principles, and functional and non-functional requirements (Hagenhoff, 2016; Müller-Wienbergen et al., 2011). Third, whilst IS research has investigated system optimization via intelligent techniques (Laudon & Laudon, 2017; Gessa, Jiménez, & Sancha, 2023), and despite the growing adoption of complementary technologies by CCOs – e.g. Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), Cloud Computing, Big Data Analytics, and Blockchain (Kargas & Loumos, 2023; Oksanen et al., 2023; Wallace et al., 2023; Ochai, 2022; Anantrasirichai & Bull, 2021; European CommissionIzsak, 2021) - research concerning the intelligent optimization of CCO-oriented management systems remains limited.

An initial exploration of literature also revealed an absence of SLRs surveying these thematic trends, thus limiting a unified conceptualization of the field and delaying the development of new CCO-oriented management solutions. Instead, previous SLRs have investigated the general concepts of management tools, technological infrastructures or advanced technologies as catalysts of innovation (Gohoungodji & Amara, 2022) or as instruments for marketing and audience development (Alnasser & Yi, 2023; Douros et al., 2023). Alternatively, scholarly reviews have focused on the application of particular technologies across the cultural and creative domains, including open innovation technologies (e.g. open-source software and collaborative platforms) (Rahimli & See-To, 2018) and AI technologies in the contexts of creative production, content generation and artistic analysis (Anantrasirichai & Bull, 2021; Oksanen et al., 2023).

Accordingly, the main objective of this study is to synthesize the existing literature on management systems implemented within CCOs and consolidate the resulting insights into a new CCO-oriented system architecture. To accomplish this objective, the review focuses on the three thematical trends by (i) identifying and characterizing the management systems presently deployed within CCOs and highlighting the organizational structures and operational processes they are expected to accommodate; (ii) summarizing the design requirements and design approaches conducive to system development and implementation; and (iii) investigating avenues for the intelligent optimization of CCO-oriented management systems via advanced technologies. Hence, by synthesizing all empirical knowledge obtained in previous literature, the study introduces an evidence-based, CCO-oriented system architecture, capable of supporting all organizational requirements, advocating for best practices, and circumventing failures observed in previous studies.

Consequently, this study presents four main contributions. Firstly, it delivers a unified conceptualization of CCO's, establishing a new theoretical foundation through their industry-convergent characteristics. Secondly, it introduces two innovative and interdisciplinary frameworks – a Research Trajectories framework to guide future investigations and a Design Agenda, which configures a new CCO-oriented system architecture, designed to holistically mediate the environmental dynamics, managerial complexities, and structural challenges of these organizations, all while respecting their autonomy and cultural and creative integrity. Furthermore, it aligns with the aforementioned industry-convergent characteristics, by (i) supporting the management of cultural and creative assets, services and activities; (ii) assisting the coordination and execution of social and educational initiatives, (iii) facilitating the collaboration and communication of stakeholders, industry professionals and audiences, and (iv) formalizing and automating operational procedures, including financial management and human resource management. Thirdly, this review yields insights that are transversally applicable across other industry sectors, particularly SMEs operating within dynamic, informal, flexible, and experimental environments. Lastly, it acknowledges the underutilization of advanced technologies in optimizing CCO-oriented management systems, further proposing their strategic integration into multiple managerial domains and operational processes of CCOs.

In light of these arguments, this study aims to answer three research questions:

RQ1) How are management systems presently utilized within CCOs, and which organizational structures, processes, or procedures should they accommodate?
RQ2) Which system requirements and design approaches are recommended for the development of management systems tailored to CCOs?
RQ3) How can advanced technologies enable the intelligent optimization of management systems tailored to CCOs?

Accordingly, this article is structured as follows: Section 2 delineates the Research Methods, including both the SLR's screening process and a bibliometric analysis of the included studies. Section 3 presents the Results and Analysis, which were thematically organized according to the RQs and culminated in three subsections—Systems and Functions, System Design, and Intelligent Optimization. Subsequently, Section 4 articulated the Discussion into two conceptual frameworks – (i) a Research Trajectories framework, meant to inspire upcoming studies in this research field, and (ii) an innovative, inclusive, and purpose-driven Design Agenda, which devises strategic recommendations for new, industry-tailored and CCO-oriented integrated management systems. Lastly, Section 5 provides the Conclusion, wherein the study's limitations and contributions were thoroughly assessed.

2. Research Methods

In order to answer the RQs, a SLR was conducted in adherence to the PRISMA protocol (Page et al., 2021). This approach supports the summarization of evidence concerning a specific technology (Kitchenham & Charters, 2007), particularly management systems deployed within various CCI domains, while simultaneously reducing the limitations of narrative reviews, including biases that may arise from the selective inclusion of studies (Tranfield et al., 2003). Furthermore, the selection of the protocol was predicated upon PRISMA's well-established, standardized, and transparent guidelines, which ensured the acquisition and critical appraisal of relevant publications within the predefined research scope (Page et al., 2021). Correspondingly, the following subsections present the search strategy, eligibility criteria, and screening process which resulted in the inclusion of twenty-three articles.

Additionally, a bibliometric analysis was performed to extract insights into emerging trends and patterns within the literature (Donthu et al., 2021). This approach enhanced the interpretation of the findings in relation to the RQs and enabled the identification of new knowledge gaps, which were synthesized in Section 4.

2.1. Systematic Literature Review

2.1.1. Search strategy

The literature search initiated in June 2024, wherein a series of research strings were formulated based on the research scope and the RQs (Tranfield et al., 2003). Their preliminary testing and iterative improvement led to the development of the final research string, which establishes a logical connection between management systems and CCOs, through the application of the Boolean operators "OR" and "AND":

(*"information systems" OR "management systems" OR "system design") AND ("creative industries" OR "cultural industries" OR "cultural organizations" OR "creative organizations"*).

This research string was executed in four scientific libraries: Scopus, Science Direct, Web of Science and IEEE. These repositories were selected for their extensive coverage of interdisciplinary and high-impact research, thereby minimizing publication bias and ensuring an heterogenous selection of studies.

2.1.2. Eligibility criteria

According to the PRISMA protocol (Page et al., 2021), all publications identified in the initial search undergo a selection process, guided by a predetermined set of eligibility criteria, namely inclusion and exclusion criteria. These criteria safeguard the integrity, replicability and auditability of the SLR.

For this study, five inclusion criteria were established: (i) Studies published between 2014 and 2024. This timeframe was selected to reflect the rapid advancements of the research fields (Sauer & Seuring, 2023), namely the ongoing transformation of CCOs and evolution of IS research. (ii) Studies published in scientific journals. This criterion certifies that all empirical studies abide to a peer-review method and provide original, reliable and auditable insights for our analysis (Sauer & Seuring, 2023). Therefore, this excludes publications such as books and book chapters, editorials, and conference proceedings; (iii) Studies written in English. This criterion is consistent with previous SLRs conducted in similar research fields (e.g., Douros et al., 2023; Gohoungodji & Amara, 2022; Oksanen et al., 2023; Rahimli & See-To, 2018); (iv) Studies that report on information systems, management systems or system design, within cultural and creative organizations, or that demonstrate organizational structures, processes or procedures that can be optimized as system functionalities. This assures that the included studies are within the scope of this research and significantly contribute to the discussion. Lastly, (v) studies available in full text, as to enable a complete evaluation of the article (Kitchenham & Charters, 2007; Tranfield et al., 2003).

2.1.3. Screening process

Following the execution of the research string in the four selected scientific libraries, the results were filtered by year, as to only contain publications issued since 2014, upholding the first eligibility criteria. The resulting 1607 articles were exported to Zotero, a reference management system that signals duplicate and retracted entries and assists in their removal from the dataset. In this identification phase, 28 duplicate entries were removed, along with 6 retracted publications. The resulting 1573 publications were deemed eligible for the screening process.

In agreement with the second eligibility criteria, entries consisting in books and chapters, editorials, conference papers and other publications that were not original studies published in scientific journals, were removed. In this phase, a total of 436 entries were removed.

The remainder 1137 publications were screened according to their language and titles. Regarding language, all 1137 entries were in English. Therefore, none was removed according to the third eligibility

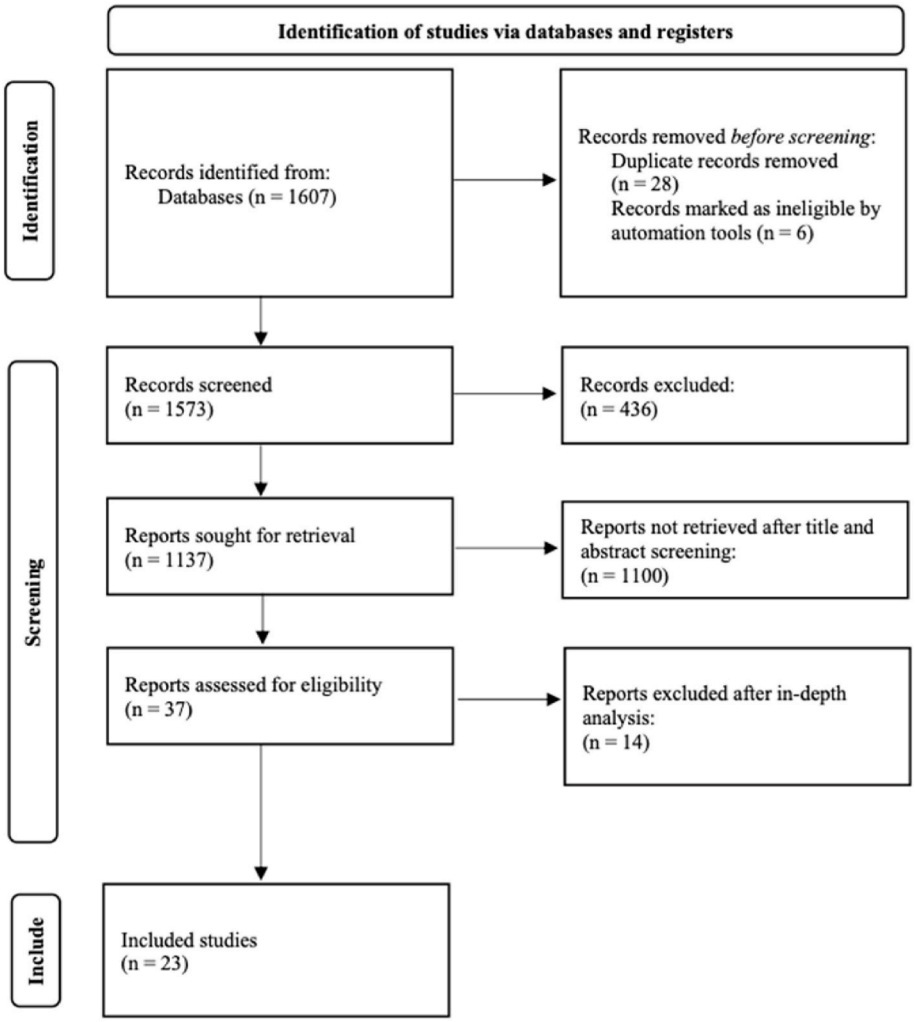

Fig. 1. Screening process - PRISMA 2020 flow diagram.

criteria. The fourth eligibility criteria was evaluated in two distinct phases, the screening of the titles and abstracts, and a subsequent comprehensive reading of the remaining entries. As aforementioned, publications that did not include or refer to information systems, management systems or system design within CCOs, were removed. In the first phase, 1137 publications were screened based on their titles and abstracts, resulting in the removal of 1100 publications for being out of scope. The remaining 37 publications were retrieved in full-text and subjected to a complete and in-depth analysis. In accordance with the fourth and fifth eligibility criteria, 23 studies were eligible for inclusion in this SLR (Fig. 1). Subsequently, the included studies were subjected to manual codification, which guided their synthetization and analytical discussion across the three primary topics of the Results and Analysis section.

2.2. Bibliometric analysis

As previously stated, a bibliometric analysis is instrumental for detecting research trends and patterns (Donthu et al., 2021), which aid in the interpretation of findings and the discovery of new research gaps.

Following the retrieval and in-depth analysis of the 23 studies, an initial assessment was conducted on three bibliometric indicators - Publication Year, Journal Quartile and Geographical Distribution. This information was sourced from the designated scientific libraries and the Scimago platform.

Given the methodological diversity and sectorial heterogeneity observed within the articles, the analysis was subsequently expanded to incorporate two additional bibliometric indicators —Methodological Approaches and Cultural Domains (UNESCO Institute for Statistics, 2009)—which were determined during the literature review. To guarantee methodological transparency, the bibliometric indicators were manually coded and systematically organized in the Bibliographical Matrix (Appendix B). All coding decisions were unanimous, as none of the studies produced bibliometric or bibliographic insights that raised ambiguities or disagreements among the authors.

2.2.1. Publication Year

Publication rate has remained consistent over the past five years, collectively representing 70 % of the included studies, as illustrated in Fig. 2. When compared with preceding years, this concentration reveals a growing interest towards this research field. The year 2023 recorded the highest number of publications, totalizing four studies. Comparatively, no publications from 2014 or 2017 were retrieved.

2.2.2. Journal Quartile

Represented in Fig. 3, this analysis revealed that studies published in Q1 journals constituted 78 % of the total publications, suggesting a high-quality standard within the sample. In contrast, five publications originated from Q2 and Q3 journals, whereas no publications from Q4 journals were reviewed.

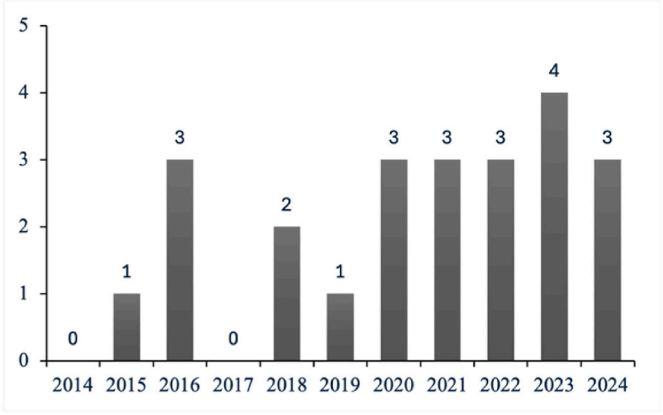

Fig. 2. Studies by year of publication.

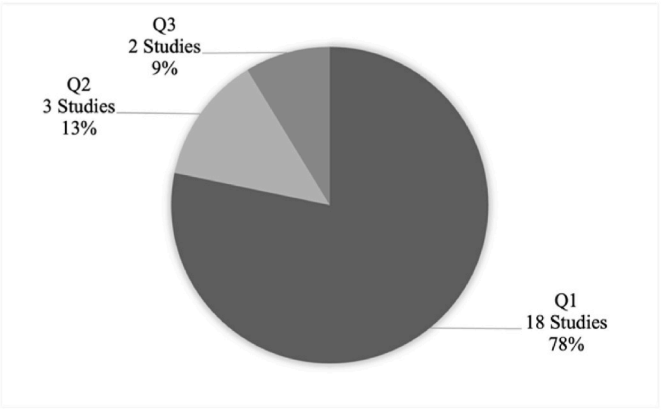

Fig. 3. Studies by journal quartile.

2.2.3. Geographical distribution

The geographical distribution of the studies was established based on the institutional affiliations of their first authors. As portrayed in Fig. 4, the publications are distributed across thirteen countries, with China (17 %) contributing four articles, followed by the United Kingdom (13 %) with three publications. However, when examined through a macroscopic perspective, European nations collectively account for over half of the included studies (52 %). Furthermore, the absence of publications originating from the Pacific Region (except Australia), the Caribbean Region and the African Continent signal the underrepresentation of plural backgrounds and geopolitical contexts.

2.2.4. Methodological approaches

Throughout the literature review, the studies were systematically categorized according to their methodological approaches, as depicted in Fig. 5. A total of five approaches were identified, with three emerging as preponderant - multiple case-studies (30 %), mixed-method approaches (30 %), and single case-studies (22 %) – highlighting the prospective enactment of actionable insights for the Design Agenda.

2.2.5. Cultural domains

In parallel, the included studies were classified according to their

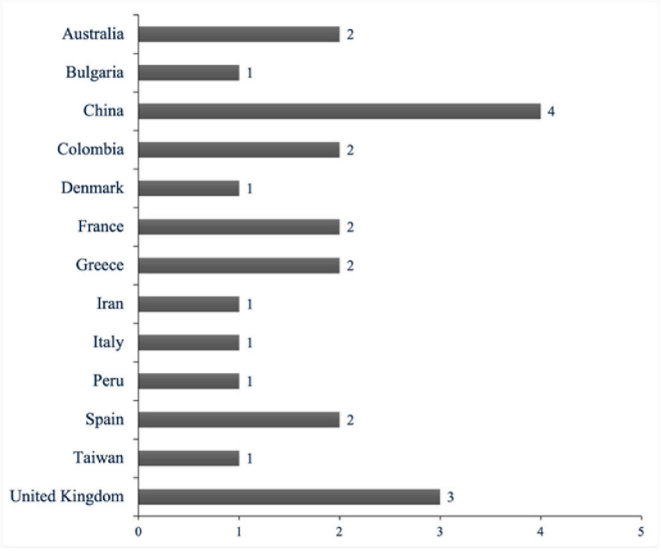

Fig. 4. Studies by geographical distribution.

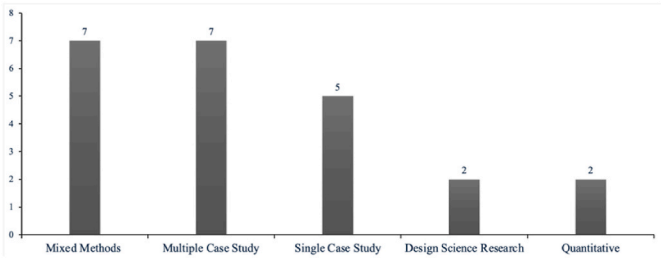

Fig. 5. Studies by methodological approach.

organizational scope and manually assigned to a Cultural Domain, as established by the Framework for Cultural Statistics Domains (UNESCO Institute for Statistics, 2009). Reflecting the industry-convergent orientation of this research, the categorization prioritized a macroscopic analysis of Cultural Domains, rather than narrowing the individual organizational typologies represented within the studies. As illustrated in Fig. 6, Cultural and Natural Heritage (56 %) encloses over half of the publications, whereas the other domains were marginally represented. This discrepancy is accentuated by the absence of studies dedicated to two Cultural Domains – "C. Visual Arts and Crafts" and "D. Books and Press". Additionally, five studies were classified as Interdisciplinary, either by traversing multiple Cultural Domains or by holistically exploring the cultural and creative industries.

3. Results and Analysis

Since the studies heterogeneously investigate management systems and complementary technologies, deployed within various industry domains and organizational environments, their insights have been thematically synthesized in this section. In coherence with the aforementioned research questions, the Results and Analysis were structured into three primary topics—Systems and Functions, System Design, and Intelligent Optimization.

3.1. Systems and Functions

In light of RQ1, literature has shown that management systems can enhance the organizational performance of CCOs, as Seclen-Luna et al. (2022) exemplified via a survey conducted on 979 Peruvian creative organizations. The survey identified a positive correlation between the utilization of management systems—such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM)—and an increase in net sales and labor productivity (Seclen-Luna et al., 2022). Notwithstanding, none of the 23 included studies further examined ERPs or CRMs.

In fact, only eight studies report on management systems presently

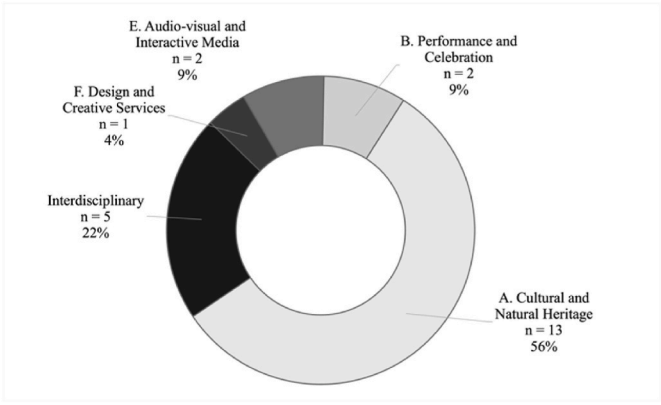

Fig. 6. Studies by cultural domains.

implemented within CCOs, as illustrated in Table 1. In alignment with the bibliometric findings, these display an asymmetrical distribution across Cultural Domains, with six representing Cultural and Natural Heritage, one targeting Audio-visual and Interactive Media, and one classifying as interdisciplinary, leaving the other domains unrepresented in system-oriented studies. The remaining fifteen studies introduce descriptive insights into the structural complexity of CCOs, reflecting the interdependencies between operational departments – e.g. finance, legal affairs, marketing, human resources, and logistics – and cultural and creative departments (Kefi et al., 2024; Pisotska et al., 2022; Wu, 2015). Notwithstanding, three system-oriented studies envisioned organization-wide management solutions (González-Rojas et al., 2016; Kamariotou et al., 2021; Wei & Guan, 2021).

First, Wei and Guan (2021) introduced a blockchain-based Programable Management System, designed for the Cultural and Creative Industrial Park, located in China. The system devised three fundamental layers: (i) a data layer, based on cloud storage, (ii) a technology layer, integrating the blockchain mechanisms, and (iii) an application layer, containing nine management modules. These modules governed various operational departments, including human resources, customer relations, governmental affairs, supply chain, IP, and equipment management. Notably, it incorporated a financial management module to authenticate, safeguard, and remit financial data, thereby expediating banking transactions and loan applications. However, the study did not confirm system implementation.

Similarly, Kamariotou et al. (2021) proposed an integrated model for digital museum management, structured around a central infrastructure layer and an outer service layer. The later was organized into six main modules – (i) e-transaction, including e-commerce, e-ticketing and e-booking; (ii) e-preservation, including e-curation and e-documentation; (iii) e-gov, including e-skills, e-workflow and e-licensing; (iv) e-audience, including e-interpretation, e-publishing, e-promotion and e-community; (v) e-science and (vi) e-archaeology. The strategic functionalities associated with this model involve the distribution of digital publications, the promotion of services and products, the simplification of financial operations, and the reinforcement of partnerships between

Table 1
Table of systems.

Citation	Type of System	Cultural Domain (UNESCO Institute for Statistics, 2009)	Case Study
Zhao et al. (2023)	Digital Collection Exchange System	Cultural and Natural Heritage	Beijing Planetarium and Beijing Museum of Natural History, China
Nova et al. (2023)	Knowledge Management System	Cultural and Natural Heritage	Historical Heritage Network (RedPHI)
Li et al. (2022)	Cultural Computing Ecosystem	Cultural and Natural Heritage	Mogao Caves and Guqin Music, China
(Torres-Gonzalez et al., 2021)	Fuzzy Inference System	Cultural and Natural Heritage	Royal Alcázar of Seville, Spain
Wei and Guan (2021)	Programable Management System	Interdisciplinary	Cultural and Creative Industrial Park, China
Kosmopoulos and Styliaras (2018)	Personalized Content Service System	Cultural and Natural Heritage	_
González-Rojas et al. (2016)	Management Software	Audio-visual and Interactive Media	Five audiovisual production companies and one game-development company
Wu (2015)	Integrated Museum Management System	Cultural and Natural Heritage	National Palace Museum, Taiwan

institutions, governmental agencies, and audiences. While the study does not frame the integrated model as a management system, it lays the foundational groundwork for its prospective development.

In an earlier study, González-Rojas et al. (2016) introduced a maturity model and a Management Software, tailored to the audiovisual sector. The maturity model evaluated six organizational capabilities - pre-production, production, post-production, people, technology and information – and detailed over one-hundred complementary attributes, distributed across five maturity levels. The open-source management software covered thirty-one functionalities, including: (i) process formalization and standardization, achieved through process templates; (ii) user management, by establishing descriptive user accounts that optimize the allocation of teams and assignments; (iii) resource and knowledge management, achieved by a centralized repository and a resource inventory that enhance the accessibility, distribution, traceability and reusability of assets; (iv) task monitoring, via an interactive dashboard that displays activity statuses and performance indicators, such as execution times and project costs; and (v) performance analysis and optimization, by reporting inefficiencies from past projects and leveraging them for optimized decision-making. Both instruments were evaluated in six organizations, with the results substantiating their efficacy in process formalization, performance monitoring, data centralization, cost regulation, and support for inter-organizational project management (González-Rojas et al., 2016).

Nonetheless, these instances display limitations in terms of viability and replicability, as two constitute theoretical studies, while the latter was exclusively tested in the audiovisual sector, although showcasing industry-convergent functionalities.

Since the remaining studies pertain to individual functional areas and organizational departments of CCOs, their analysis has been structured into nine sub-thematic segments. Each segment commences with a review of the system-oriented studies, reporting on their functional design and system attributes, followed by the insights gathered from descriptive studies. The final thematic segment synthesizes three Transversal Observations, which emerged consistently throughout the manual coding and contribute overarching insights within this theme.

3.1.1. Knowledge and project management

As CCOs demonstrate high degrees of informality and flexibility, they are advised to adopt Knowledge Management Systems (KMS) and Project Management Systems (PMS), as to optimize continuous learning and ensure successful project outcomes (González-Rojas et al., 2016).

While González-Rojas et al. (2016)' software integrates knowledge management and project management functionalities, another study proposes a KMS, tailored to the Iberoamerican Historical Heritage Network - RedPHI (Nova et al., 2023). Based on a design science approach, the system integrated three modules: (i) a project management module, (ii) a visualization module, and (iii) a fieldwork module. According to Nova et al. (2023), the KMS strengthened RedPHI's dynamic collaboration and decision-making practices, particularly by simplifying the retrieval and transference of knowledge resources, and by incorporating a mobile application interface.

Complementarily, two descriptive studies recall the fundamental balance between technical decisions and cultural and creative principles, vindicating for autonomy in artistic and curatorial decisions within project management (Pisotska et al., 2022; Trevisan & Mouritsen, 2023). This argument was illustrated by Trevisan and Mouritsen (2023) in performance-based projects, wherein reducing rehearsal time in favor of productivity compromised the performance's quality. Besides timeframes, the allocation of spaces is another concern in cultural and creative project management, as CCOs may rely on external infrastructures to accomplish short-term projects and perform temporary activities (Pisotska et al., 2022).

3.1.2. Consumer Relationship, Marketing and Social Media Management

Although no studies introduced management systems dedicated to this theme, eight descriptive studies revealed how digital environments and complementary technologies are revolutionizing CCOs. For instance, social media platforms are transversally utilized to transmit institutional information, announce activities, promote digital content, source new sponsorships, and increase audiences' awareness, engagement and feedback (Gil-Fuentetaja & Economou, 2019; Gombault et al., 2016; Kamariotou et al., 2021; Kefi et al., 2024; Kosmopoulos & Styliaras, 2018; Li, 2020; Tim et al., 2020).

Likewise, institutional websites have been traditionally established in CCOs, having progressed from static interfaces to interactive webpages (Kefi et al., 2024), incorporating digital collections, educational resources, and other audiovisual materials (Gil-Fuentetaja & Economou, 2019; Gombault et al., 2016; Kamariotou et al., 2021). Nonetheless, Gombault et al. (2016) accentuates the urgency for well-maintained accounts and websites, as outdated and neglected platforms may damage institutional reputation.

Other growing trends include interactive platforms, educational games, mobile applications, and online events (Gil-Fuentetaja & Economou, 2019; Gombault et al., 2016; Kamariotou et al., 2021; Tim et al., 2020). As an example, art museums have tested mobile applications, wherein users bookmarked their favorite exhibitions and artworks, and integrated upcoming exhibitions into their personal calendars (Kosmopoulos & Styliaras, 2018). Furthermore, Walmsley (2016) conducted a case-study on a temporary digital engagement platform, observing the interactions between audiences and artists throughout a two-week creative process. The study included pre-performance activities and a final live performance and revealed how the platform's participatory design enriched audience experience, consequently enhancing anticipation for- and enjoyment of-the final performance. Interestingly, the platform empowered new audiences who would otherwise feel apprehensive about engaging with unfamiliar artforms in physical environments, indicating how these networked and participatory approaches may redefine inclusive cultural and creative projects.

3.1.3. Human resources management

Similarly, none of the studies proposed systems dedicated to human resource management. Nevertheless, a case-study illustrated the relational dynamics and individual responsibilities, of permanent and temporary personnel, working in the Biennale Foundation and the Venice Film Festival (Pisotska et al., 2022). Particularly, permanent personnel (e.g. Directors and Managers), were responsible for administrative and managerial processes, such as program and budget approval, resource allocation, and recruitment. Alternatively, temporary employees managed project activities and contributed with specialized industry insights and ideas, as they often participate in multiple projects throughout the year and return for recurring events, such as the Venice Film Festival. In all, the study demonstrated that promoting trust between these professionals is paramount, as to ensure bilateral and symbiotic support in cultural and creative projects (Pisotska et al., 2022).

As for talent acquisition, three studies underlined the financial and administrative constraints associated with sourcing, recruiting and retaining specialized personnel, notoriously in interdisciplinary hires, where technical proficiency must be accompanied by a familiarity with the cultural and creative environment (Gombault et al., 2016; Tim et al., 2020; Wu, 2015).

3.1.4. Sales and revenue management

Whilst no systems were devised for this theme, a multiple case-study conducted on eighty CCOs recognized emerging business models and revenue streams (Li, 2020). Primarily, it evidenced the upsurge of portfolio business models, encircling ecosystems of revenue streams, which strengthen the CCO's value propositions, endorse institutional credibility, fortify internal and external relationships, and ultimately reinforce their financial sustainability (Li, 2020). Historically, these organizations relied on public funding and revenue generated in

traditional transactions, such as in brick-and-mortar stores, local markets and other physical venues. However, a visible shift towards e-commerce platforms and digital marketplaces has occurred; as exemplified by Li (2020), art studios are adopting online platforms to showcase portfolios and commercialize artworks by independent artists, thereby amplifying their visibility in new market segments. In addition, two emerging business trends illustrate the longstanding dichotomy inherent to the cultural and creative industries - one focuses on personalization, epitomizing exclusivity and uniqueness, while the other focuses on standardization, predicated upon the scalable commercialization of products and services, with minimal replication costs (Li, 2020).

3.1.5. Infrastructure management

Considering the cultural significance of historical buildings, monuments and architectural landmarks, UNESCO has instituted a set of regulatory mechanisms that preventively monitor World Heritage Sites (WHS), averting major restoration projects and their irreversible deterioration (Torres-González et al., 2021).

Correspondingly, one case-study introduced a fuzzy inference system designed for the infrastructural management of WHSs (Torres-González et al., 2021). The system was informed by (i) in-situ structural inspections and by (ii) geospatial reports, provided by governmental institutions, transversally evaluating twenty-one variables, including intrinsic vulnerabilities (e.g. geological location and occupancy) and external hazards (e.g. thermal stress and seismic activity). The case-study was conducted at the Royal Alcázar of Seville, located in Spain, and revealed favorable results, as the system accurately diagnosed its infrastructural vulnerabilities. Additionally, the authors highlighted the system's adaptability and scalability to other heritage sites, contingent upon their specific environmental and sociocultural contexts (Torres-González et al., 2021).

3.1.6. Collection, artifact and Asset Management

Within this theme, management systems fulfill two primary functions: (i) the registration and archival of artifactual information, such as material properties and historical provenance, thereby systematizing collection management, and (ii) the materialization of digital catalogues and virtual exhibitions, which alleviate cultural accessibility impediments, namely geographic remoteness, artifact deterioration, linguistic barriers, and financial constraints (Borissova, 2018; Gil-Fuentetaja & Economou, 2019; Gombault et al., 2016; Kamariotou et al., 2021; Kefi et al., 2024; Nishanbaev, 2020; Tim et al., 2020; Wu, 2015). For instance, these complementary technologies provide interactive and immersive experiences to worldwide audiences, and have been significantly enriched by 3D, AR and VR (Gombault et al., 2016; Li et al., 2022; Nishanbaev, 2020; Tim et al., 2020).

This theme also encompasses the majority of case-studies, heterogeneously covering management systems and complementary technologies.

First, Zhao et al. (2023) constructed a Museum Art Exchange Protocol (MAXP) and a Digital Collection Exchange System, centered on encryption and blockchain mechanisms, later explained in the Intelligent Optimization section. Both instruments were evaluated through a digital artifact exchange, conducted between the Beijing Planetarium and Beijing Museum of Natural History, in China. The results positively corroborated their effectiveness in fortifying transactional security and traceability, as well as in safeguarding copyright protections.

Second, Li et al. (2022) introduced a Cultural Computing Ecosystem, structured around three components: (i) data acquisition, (ii) digital modeling, and (iii) data application. The two initial components systematically identified, classified and extracted artifactual attributes into a structured database, whereas the third operationalized them into a digital exhibition via VR and AR technologies. The system was evaluated in two case-studies - one of intangible nature, involving Guqin music, and one of tangible nature, surrounding the Mogao Caves, in China – with both validating the system's efficacy in optimizing workflows, and its adaptability to various artifact typologies.

Third, Nishanbaev (2020) designed a web-repository tailored to cultural heritage sites, leveraging geospatial data, 3D models and a web content management system (WCMS). Constructed upon an open-source WCMS, the repository benefited from a modular architecture and auto-generated interfaces, entailing three sequential development phases: (i) the integration of 3D models into a WCMS, via a cross-platform document database; (ii) the configuration of the repository's back-end interface; and (iii) the implementation of a front-end user interface, augmented by a 3D library. The repository was tested via a sample dataset of eleven heritage sites and demonstrated its adaptability to incorporate other heritage landmarks.

Fourth, Tim et al. (2020) conducted a case study on a digital transition project, undertaken by the Qin Shi Huang's Mausoleum Site Museum, located in China. In-depth interviews revealed that, prior to the transition, the museum predominantly relied on resource-intensive manual operations. The transition project established a digital collection, integrating both 3D and AR technologies, to protect fragile artifacts and secure restoration activities, as well as an AR-based application, which allowed visitors to virtually interact with the museum's exhibitions and artifacts.

Lastly, Wu (2015) examined the construction of an Integrated Museum Management System, for the National Palace Museum, located in Taiwan. Founded on a relational database, it unified five legacy systems - a CMS, two Digital Libraries, an Image Management System and an Authority Control System. The system's functionalities were dedicated to exhibition and conservation management, inventory tracking, artifact registration, information search, and audit reporting. Notably, Wu (2015) accentuated that conventional CMSs, traditionally designed for museums, no longer meet management requirements, compelling their expansion to accommodate broader managerial functionalities.

3.1.7. Personalized content services, recommendation systems and guidance systems

One study introduced an architecture for a Personalized Content Service System, designed for museum exhibitions (Kosmopoulos & Styliaras, 2018). The system's architecture incorporated five thematic subsystems: (i) Localization, responsible for identifying a visitor's real-time location, and their nearest artifacts via QR code scanning, infrared sensors, Bluetooth, Wi-Fi, or wearable cameras; (ii) Recommendation, which generated personalized suggestions for museum visitors via inference mechanisms, cross-referencing visitor's profiles (e.g. personal preferences, demographic data and accessibility requirements) and real-time parameters (e.g. available time, location and exhibition layout); (iii) Content, operating as a centralized repository for textual and audiovisual materials related to the exhibition and its artifacts; (iv) Visitor's Visualization, which adapted and displayed these materials for mobile web-browsers, incorporating interactive educational games, and immersive AR experiences; and, (v) Curator's Visualization, illustrating exhibition metrics and visitor statistics, including visit duration, attendance patterns, and exhibition and artifact popularity.

Drawing inspiration from recommendation systems and guidance systems, the system envisions the enrichment of audience experiences and the compilation of insights into visitor behaviors and exhibition impact, posteriorly actionable in curatorial and museum management (Kosmopoulos & Styliaras, 2018).

3.1.8. IP management

IP management hinges upon legal frameworks and institutional mechanisms designed to regulate the ownership, reproduction, and commercialization of tangible and intangible assets. Two aforementioned systems significantly integrate IP management functionalities: the Digital Collection Exchange System, which verifies digital copyrights and authorizations, thereby preventing illicit transfers, unauthorized distribution, or asset destruction (Zhao et al., 2023), and the

Programmable Management System, which features an IP Protection module, that validates licensing agreements and expediates payment transactions to copyright holders (Wei & Guan, 2021).

Studies also acknowledged that CCOs routinely register and copyright their proprietary elements - including institutional name, logo and cultural and creative assets – enabling their monetization via licensing agreements for commercial, industrial, and scientific applications, thereby fortifying the organization's financial sustainability (Borissova, 2018; Wu, 2015). Albeit its invaluableness, IP management remains an industry-transversal challenge, constrained by inadequate legal frameworks and unclear policy guidelines, exacerbating licensing infringements, copyright violations and the illegal commercialization of proprietary assets (Borissova, 2018).

3.1.9. Transversal Observations

This final thematic segment uncovers industry-convergent patterns, including (i) foundational dynamics that precondition system development, (ii) transversal inhibitors that obstruct technological adoption, and (iii) prospective trajectories for organizational growth.

Firstly, management systems tailored to CCOs are expected to accommodate their foundational dynamics, mirroring organizational hierarchies, departmental structures, resource priorities, institutional ethos and leadership styles, as the confluence between limited resource availability, divergent commercialization philosophies and fragmented managerial approaches, may discourage technological integration (Gombault et al., 2016; Kefi et al., 2024; Li et al., 2022; Seclen-Luna et al., 2022; Wu, 2015). Furthermore, organizational identity is another fundamental cornerstone of CCOs, reinforcing internal cohesion and institutional unity, whilst shaping their overarching values and strategic principles (Pisotska et al., 2022). Accordingly, system development and integration initiatives should maintain consistency and adherence to this foundational identity.

Secondly, studies transversally recognized inhibiting factors that obstruct the integration and acceptance of management systems and complementary technologies within CCOs. Among them, the foremost inhibitor is resource scarcity, unfolding financial, administrative, technological, infrastructural and educational limitations (Gombault et al., 2016; Kamariotou et al., 2021; Li et al., 2022; Tim et al., 2020; Walmsley, 2016). Consequently, these discourage investments in resource-intensive technologies, such as sensors (Kosmopoulos & Styliaras, 2018) and digital platforms (Walmsley, 2016), whilst also precipitating institutional disruption, decision paralysis and resistance to change (Gombault et al., 2016; Tim et al., 2020). Nevertheless, whilst interdisciplinary collaborations were extensively advocated as to alleviate these hindrances (Gombault et al., 2016; Kamariotou et al., 2021; Li et al., 2022; Tim et al., 2020; Wu, 2015), these are further constrained by recruitment difficulties that prevent the acquisition of interdisciplinary personnel (Gombault et al., 2016; Tim et al., 2020; Wu, 2015).

Other inhibitors arise from the inherently dynamic and flexible nature of CCOs, attributable to structural informality, unmanageable bureaucracy, vague internal guidelines and minimal process formalization. Altogether resulting in managerial improvisation, unregulated financial expenditures, scheduling delays, IP vulnerabilities and unmonitored project results (Gombault et al., 2016; González-Rojas et al., 2016; Tim et al., 2020), which inadvertently hamper technological adoption.

The final inhibiting factors surround technical complexities, encountered throughout system integration and in the long-term maintenance of technological solutions, specifically in: (i) data management procedures, wherein the heterogeneity of metadata formats and information sources difficult data retrieval, reformatting, and processing, thereby heightening the risk of informational loss (González-Rojas et al., 2016; Li et al., 2022; Nishanbaev, 2020; Nova et al., 2023; Wu, 2015); (ii) cross-platform interoperability, as system functionalities and complementary technologies ought to remain compatible throughout designated platforms and digital environments, underscoring a technologically complex requirement (Kosmopoulos & Styliaras, 2018); (iii) IP and privacy management, hindered by inadequate regulations, ambiguous guidelines, resource scarcity and technical illiteracy (Borissova, 2018; Kosmopoulos & Styliaras, 2018; Nishanbaev, 2020); and (iv) technological sustainability, as the inevitability of obsolescence mandates the periodic actualization and replacement of software, including networks, mechanisms and legacy systems, as well as hardware and other physical equipment (Gombault et al., 2016; Wei & Guan, 2021; Wu, 2015; Zhao et al., 2023).

Whilst these multilayered hindrances culminate in low technological adoption rates, one study offered recommendations to expediate system integration, including: (i) strategically aligning budgetary priorities with the projected system expenditures; (ii) securing endorsement from senior executives and key stakeholders; (iii) fostering consensus between IT personnel and other departments; (iv) enhancing IT literacy among personnel; (v) acknowledging and adjusting the roles of system end-users, and (vi) accounting for the lifespan of legacy systems (Wu, 2015).

Finally, to diminish inhibiting factors and positively encourage technological innovation, organizations advocate for financial endowments from local and national governmental agencies, via grants and subsidies, as well as external investments from the private sector (Gombault et al., 2016). Simultaneously, CCOs are urged to reconceive their technological management strategies, prioritize training initiatives, cultivate external partnerships and pursue innovative solutions, including practice-based networks, technological incubators, and communities of practice, thereby fostering collective learning, knowledge exchange, and co-creating practices (Gombault et al., 2016; Kefi et al., 2024).

3.2. System Design

As to answer the RQ2, the insights concerning design approaches and system requirements were assembled in this section. In total, the studies acknowledged twelve design requirements, alternatively entitled as non-functional requirements, constituting foundational standards and guidelines that were posteriorly operationalized in the Design Agenda. Furthermore, two complementary design approaches were recommended for system design.

3.2.1. Design requirements

Firstly, systems tailored to CCOs must prioritize and preserve the symbolic significance of cultural and creative assets, whilst adhering to mandatory technical standards. This argument underscores a **variability** requirement, as management systems must operationalize heterogenous assets, with varying cultural backgrounds, historical provenances and material properties, all which influence their terminology, representation standards, and metadata formats (Wu, 2015). Furthermore, culturally symbolic artifacts must be prioritized, as evolving academic conceptualizations may demand data reconfigurations and new categorization standards (Wu, 2015).

Secondly, system design must guarantee **consistency**. Whilst seemingly contradicting the preceding requirement, CCOs are consistently regulated by international representation standards, that delineate guidelines for the archival and documentation of artifactual information (Wu, 2015). Therefore, system functionalities, structural databases and user-interfaces, must consistently abide by institutional or industrial standards. This consistency requirement further incorporates internal procedures and organizational processes, being successfully operationalized by González-Rojas et al. (2016) in a Management Software, through the implementation of process templates.

Thirdly, due to CCOs' prevailing structural informality, institutional documents and project files are often allocated to multiple storage solutions, including personal desktops, external hard-drives or cloud platforms (González-Rojas et al., 2016). Therefore, establishing another design requirement – **capacity**. For instance, deciding upon a single centralized storage solution, either in-house or external, is pivotal for

ascertaining storage capacity, information transference, and import/export procedures (González-Rojas et al., 2016).

As observed, CCOs advantageously leverage numerous complementary technologies. Thus, the fourth and fifth design requirements - **interoperability** and **connectivity** - guarantee the uniformity and functional continuance of system functionalities and visual interfaces, across designated platforms (e.g. mobile applications and web-browsers [Kosmopoulos & Styliaras, 2018]). Congruently, Wu (2025) provided an actionable design insight, demonstrating that the Integrated Museum Management System, resultant from the conversion of five legacy systems, was sustained by a single operative system and programing language, thereby facilitating interoperability. In parallel, CCOs must either invest in proprietary software or elect open-source technologies for the deployment of institutional systems. Two studies favored open-source technologies due to their flexibility, by offering both downloadable software solutions and cloud-hosted services (Nishanbaev, 2020), and by ensuring interoperability amongst web-based technologies, such as in browser-based statistics tools (Kosmopoulos & Styliaras, 2018).

Establishing the aforementioned system standards foregrounds the sixth and seventh design requirements - **maintainability** and **reliability**. Respectively, these requirements foresee internal guidelines for system maintenance, and thresholds for system performance, prospectively enabling warnings from occurring errors (e.g. abnormal information input) (Zhang et al., 2024).

The eighth and ninth design requirements also convey an interdependence - **customizability** and **modularity**. Customizability is actionably represented in system functionalities, allowing the configuration of features according to project requirements (Nova et al., 2024), as well as in visual interfaces, operationalizing textual information, audiovisual materials and interactive controls, that ultimately enrich user experience (Nishanbaev, 2020). Thereupon, modularity is an attribute that perceivably amplifies customizability, as systems designed under a modular architecture can be augmented and customized via the incorporation of new functional modules. Accordingly, 8 studies proposed systems or complementary technologies based on modular architectures (González-Rojas et al., 2016; Kamariotou et al., 2021; Kosmopoulos & Styliaras, 2018; Li et al., 2022; Nishanbaev, 2020; Nova et al., 2023; Wei & Guan, 2021; Wu, 2015).

Furthermore, envisioning forthcoming transformations (Kefi et al., 2024), potentiated by technological optimization (e.g. system expansion by modular integration) or by structural organizational shifts, establishes the tenth design requirement - **upgradability**. This requirement is responsible for successfully ensuring system reconfigurations and augmentations via new internal functionalities or external complementary features (Kosmopoulos & Styliaras, 2018; Nova et al., 2023; Zhang et al., 2024).

The final design requirements - **usability** and **accessibility** – guarantee that systems tailored to CCOs respect the varying levels of technical expertise among system end-users. Therefore, system design must prioritize accessible and user-friendly interfaces, featuring clear navigation and intuitive operations, actionable by the integration of dropdown lists and menu bars (Zhang et al., 2024).

3.2.2. Design approaches

As systems must be coherently attuned to the organizational resources, technological infrastructures, strategic orientations, and foundational identities of CCOs, two design approaches were extrapolated from the literature – participatory design and human-centered design.

The foremost design approach was **participatory design**, interchangeably entitled as interdisciplinary design, founded upon the in-depth collaboration between system designers (e.g. IT personnel) and the system end-users (e.g. institutional personnel), certifying the equilibrium between technical requirements, and cultural and creative integrity (Gombault et al., 2016; Kamariotou et al., 2021; Li et al., 2022; Tim et al., 2020; Wu, 2015). Participatory design respects the pathways of interdisciplinary cultural and creative projects, as exemplified by Tim et al. (2020) wherein restoration initiatives required the continuous collaboration between 3D-specialized personnel and museum professionals. Moreover, one study delivered a valuable insight into participatory design – Wu (2015)'s Integrated Museum Management System was constructed by IT experts and departmental representatives, who communicated and negotiated requirements during system design and development.

The second design approach was **human-centered design**, diverging from the abovementioned synchronous co-creation practices, it instead focus on preliminary research to inform system design. This approach was identified in two studies – (i) González-Rojas et al. (2016) constructed a Management Software based on insights gathered from interviews and surveys directed at industry professionals, as well as from documental analysis, and (ii) Li et al. (2022) recommended conducting pre-design surveys and pursue user feedback throughout the design process.

Both design approaches are suitable to construct management systems, as long as these respect internal organizational procedures and departmental requirements. For instance, management responsibilities often fluctuate between internal departments, enclosing "*ideation, pre-production, production, post-production, and distribution activities*" (Jahromi & Ghazinoory, 2024, p. 2). Therefore, system functionalities and interfaces must accompany transversal procedures, accommodate the nuanced workflows and routine practices of end-users, and respect the foundational values of CCOs (Kefi et al., 2024; Wu, 2015).

3.3. Intelligent Optimization

In response to RQ3, the literature acknowledged six advanced technologies, operationalized within two primary dimensions: (i) cultural and creative productions and (ii) organizational management. However, the studies significantly diverged from the original proposition of RQ3, negligibly demonstrating how advanced technologies enable the intelligent optimization of CCO-oriented management systems. Notwithstanding, various actionable insights were extrapolated and posteriorly synthesized into strategic recommendations, as illustrated in the Design Agenda.

Furthermore, whilst cultural and creative production transcends RQ3, this first dimension was substantially portrayed in the reviewed studies, exemplifying how advanced technologies stimulate creative processes, empower hybrid productions, accelerate workflows, reinforce quality control, and amplify audience engagement (Jahromi & Ghazinoory, 2024; Kamariotou et al., 2021; Kefi et al., 2024; Li et al., 2022; Tim et al., 2020; Trocin et al., 2023). Congruently, said technologies may be strategically leveraged to fortify organizational management, thereby materializing the second dimension.

With respect to their inherent functional heterogeneity, these advanced technologies were examined individually, as follows:

3.3.1. Artificial Intelligence

Within the first dimension, the upsurge of AI-driven production tools assisted in the automation of labor-intensive processes, including scenario development, motion animation, lip-syncing, script writing, digital rendering, and image enhancement (Jahromi & Ghazinoory, 2024).

Concerning the second dimension, AI-based intelligent mechanisms optimized organizational management activities, as exemplified by Torres-González et al. (2021), wherein their AI-based Fuzzy Inference System, successfully supervised the infrastructural management of a WHS. Furthermore, AI techniques serve as the foundational pillar for other advanced technologies, including Big Data Analytics and Machine Learning.

3.3.2. Big Data Analytics

This intelligent technique expedites the synthetization of extensive datasets - sourced from organizational activities, technological devices,

and third-party inputs - subsequently producing data-driven insights (Jahromi & Ghazinoory, 2024; Kamariotou et al., 2021).

In the sphere of cultural and creative production, these strategic insights may inform casting decisions, content creation initiatives, and product personalization opportunities (Jahromi & Ghazinoory, 2024).

Simultaneously, within Consumer Relationship, Marketing and Social Media Management, this advanced technology enables the analysis of audience profiles, consumption trends, behavioral patterns and online interactions (e.g. engagement metrics and conversion rates), thereby producing insights into partnership opportunities, audience-targeted marketing campaigns, and content distribution strategies (Jahromi & Ghazinoory, 2024). For Project Management, corresponding insights can increase operational efficiency by informing resource allocation strategies, budget forecasting and project workflows (Jahromi & Ghazinoory, 2024; Kamariotou et al., 2021).

3.3.3. Machine Learning (ML)

Primarily linked to the first dimension, ML complements traditional productions by generating design recommendations (e.g. layout structures and color schematics) and by automating repetitive tasks (e.g., text summarization and transcription) (Trocin et al., 2023). Additionally, its pattern recognition capabilities have been utilized in digital restoration projects (Li et al., 2022) and in behavioral and emotional analysis, aimed at audience profiling (Kosmopoulos & Styliaras, 2018). Nonetheless, industry professionals lack trust in ML-based tools, citing their inconsistent outputs and inability to meet production expectations (Trocin et al., 2023).

For the second dimension, Trocin et al. (2023) identified pre-existing ML applications within Human Resource Management and Customer Relationship Management and acknowledged its potential functionality for requirement verification within creative projects.

3.3.4. Cloud Computing

In line with the first dimension, Cloud Computing expedites digital rendering processes, collaborative production projects, and content distribution activities, simultaneously enabling asset protection and file recovery mechanisms (Jahromi & Ghazinoory, 2024; Nova et al., 2023).

As per the second dimension, although it constitutes a cost-effective alternative for organizational management - by diminishing infrastructural investments on proprietary IT equipment, as well as reducing energy consumption - cloud-based solutions must be configured according to internal management policies, legal frameworks, organizational dynamics, security requirements, and data management standards (Kamariotou et al., 2021; Kosmopoulos & Styliaras, 2018).

3.3.5. Internet of things (IoT)

IOT refers to "*an eco-system of technologies (*e.g.*, smart objects and RF technologies) that are used to monitor physical objects and capture meaningful data of and around the objects*" (Tim et al., 2020, p. 6). Therefore, IoT technologies can propel immersive productions and interactive installations, hybridly combining virtual and physical environments (Jahromi & Ghazinoory, 2024).

Alternatively, in the context of organizational management, IoT devices can remotely monitor institutional infrastructures, assets, and environmental conditions, aiding in collection management, inventory tracking and maintenance operations (Jahromi & Ghazinoory, 2024; Tim et al., 2020; Torres-González et al., 2021; Wei & Guan, 2021). Given their data collection capabilities, these may sustain insights into emerging production opportunities and resource distribution strategies, contributing to organizational productivity (Jahromi & Ghazinoory, 2024; Zhang et al., 2024).

3.3.6. Blockchain

Lastly, blockchain technologies may strengthen cultural and creative production - particularly in digital asset creation, merchandise trades, crowdfunding initiatives, and content monetization and distribution - via encryption algorithms, digital watermarks, and smart contracts, which can "*be used to automate licensing agreements, royalty payments, and distribution terms*" (Jahromi & Ghazinoory, 2024, p. 5).

In parallel, these technologies can be integrated within organizational management, as illustrated by Wei and Guan (2021)'s Programable Management System, which was constructed on blockchain-based mechanisms (e.g. cryptography, smart contracts, and timestamping), and envisaged the managerial support of various departments, including Human Resources, Finance, Supply Chain and IP.

Furthermore, these technologies were particularly significant for IP management, as their capacities for ownership authentication, asset provenance traceability, and copyright protection, successively mitigate copyright infringements, unauthorized transfers, improper distribution, or asset destruction (Jahromi & Ghazinoory, 2024; Zhao et al., 2023). For instance, whilst artifact exchanges are an integral process within CCOs, traditional exchange methods remain vulnerable to security breaches, system overloads, and budgetary constraints (Zhao et al., 2023). As to diminish these challenges, Zhao et al. (2023) introduced a blockchain-based Digital Collection Exchange System, wherein encryption algorithms and non-fungible tokens (NFTs) are utilized to authenticate copyrights, monitor system entries, and supervise real-time digital exchanges.

4. Discussion

Given that the Results and Analysis section provides direct responses to the proposed RQs, the Discussion aims to interpret and integrate the insights emerging across the three thematic dimensions. Accordingly, the Discussion is structured into two conceptual frameworks – a Research Trajectories Framework and a Design Agenda – meant to consolidate the findings and foreground their theoretical and practical contributions to this research field.

4.1. Research Trajectories

The first framework encapsulates a set of Research Trajectories, which originated from the knowledge gaps detected throughout the literature review. As illustrated in Table 2, the literature revealed six axes of discussion – (i) Fragmented Management Systems, (ii) Asymmetrical Distribution, (iii) Structural Informality, (iv) Off-the-shelf Incompatibility, (v) Intelligent Optimization Via Complementary Technologies, and (vi) Innovation Initiatives - which informed the RQs proposed for future investigations. Furthermore, to thoroughly mitigate these knowledge gaps, forthcoming studies should integrate exploratory research methodologies, including fieldwork techniques.

4.2. Design Agenda

The second framework corresponds to a tripartite Design Agenda (Table 3), constituted of strategic recommendations for a CCO-oriented management system architecture, including (i) innovative system functionalities, (ii) new approaches to system design, and (iii) intelligent system optimization.

Fundamentally, this framework merges the empirical findings of the SLR and the established theoretical perspectives on CCOs, presented in the Introduction, thereby extending the analysis beyond descriptive synthesis and reinforcing both the theoretical significance and the practical relevance of the study. For instance, it reflects both the functional structures documented in the reviewed studies – e.g. Knowledge Management and Asset Management – alongside complementary managerial domains, represented in the exploratory literature. One notable example is the Internal Management Module, designed to support the intrinsic informality, dynamism, and unpredictability of CCOs (Alacovska, 2018; DeFillippi, 2013; Holzmann & Mazzini, 2020; Salder, 2020) via the formalization of internal directives and institutional processes. Likewise, in recognition of CCOs' societal and educational

Table 2
Research trajectories framework.

Axes of Discussion	Literature Insights	Prospective Research Questions
1. Fragmented Management Systems	Whilst three studies envisioned organization-wide management solutions (González-Rojas et al., 2016; Kamariotou et al., 2021; Wei & Guan, 2021), the majority introduced fragmented management systems (Kosmopoulos & Styliaras, 2018; Li et al., 2022; Nova et al., 2023; Torres-Gonzalez et al., 2021; Wu, 2015; Zhao et al., 2023).	- Which intrinsic and extrinsic factors (e.g. institutional resources, resistance to change, technological knowledge) substantiate the prevalence of fragmented management systems within the context of CCOs? - Which drivers and inhibitors influence CCOs' proclivity towards fragmented management systems, in lieu of integrated management solutions? - How do industry domains and organizational typologies impact CCOs' adoption of integrated management systems?
2. Asymmetrical Distribution	Although this research field has witnessed an upsurge in academic interest, as reflected by the increasing publication rate, the studies revealed an asymmetrical distribution across industry domains and geographical regions. A. Industry Domains The bibliometric analysis evidenced an overrepresentation of the Cultural and Natural Heritage domain, encircling half of the included studies. In contrast, Visual Arts and Crafts, alongside Books and Press, were not individually explored.	A. Industry Domains - Which intrinsic and extrinsic factors (e.g. institutional resources, technological knowledge and social influence) contribute to the asymmetrical distribution of management systems across industry domains? - Which industry domains exhibit more conservative or innovation-driven attitudes towards technological adoption? - Which organizational dynamics (e.g. technical operations, management practices, and departmental processes) may constrain the integration of management systems across industry domains?
2. Asymmetrical Distribution (cont.)	B. Geographical Regions The studies disproportionately featured European-based research, contrastingly lacking studies originating from the Pacific Region (except Australia), the Caribbean Region and the African Continent. This asymmetry portrays the systemic underrepresentation of plural backgrounds within IS research and accentuates the urgency for democratic, decolonial and inclusive academic discourses (Chughtai & Young, 2024; Ferraz, 2023).	B. Geographical Regions - How do CCO's geographical backgrounds, geopolitical environments, and sociocultural contexts influence their organizational dynamics (e.g. technical operations, management practices, and departmental processes)? - In what ways could management systems be designed to match the unique requirements of underrepresented CCOs, as to enhance their global competitiveness and ensure their long-term sustainability? - How could international partnerships and interdisciplinary projects mitigate this systemic asymmetry, thereby fostering inclusivity and diversity within IS research?
3. Structural Informality	Characteristically, CCOs operate under complex organizational environments - distinguished by their flexibility, informality and fluidity – and may lack internal guidelines, management protocols or standardized processes (Collyer et al., 2010; DeFillippi, 2013; González-Rojas et al., 2016; Holzmann & Mazzini, 2020; Salder, 2020; Seidel, 2009; Tim et al., 2020).	- How does structural informality impact decision-making processes within CCOs? - In which ways do industry domains and organizational typologies diverge in decision-making processes? Are there transversal characteristics (e.g. stakeholder participation and scheduling)? - Could management methodologies and decision-making models be implemented within CCOs?
4.Off-the-shelf Incompatibility	The deployment of management systems within CCOs is contingent upon the idiosyncrasies and convergencies of the Cultural and Creative Industries. As a result, off-the-shelf and standardized management systems are often ill-equipped for the methodological frameworks, theoretical foundations and specialized requirements of CCOs (e.g. lacking operational mechanisms to govern the symbolic dimensions of cultural assets) (Wu, 2015).	- What is the current market landscape of off-the-shelf management solutions (e.g. ERPs) for the Cultural and Creative Industries? - If industry-tailored solutions are available, what are their main characteristics and industry-specific attributes (e.g. system functionalities and pre-packaged modules)? Do they exhibit transversal applicability across CCOs, or are they targeted to individual industry domains? - Which underlying reasons (e.g. financial viability, organizational misalignment, industry-specific requirements) have restricted the development of off-the-shelf management solutions tailored to the Cultural and Creative Industries?
5. Intelligent Optimization Via Complementary Technologies	Within CCOs, complementary technologies entertain two overarching purposes: (i) fostering audience engagement and interaction via digital communication channels (Gil-Fuentetaja & Economou, 2019; Gombault et al., 2016; Kamariotou et al., 2021; Kefi et al., 2024; Kosmopoulos & Styliaras, 2018; Li, 2020; Tim et al., 2020; Walmsley, 2016), and (ii) optimizing production activities and	- Which intrinsic and extrinsic factors (e.g. institutional resources, resistance to change, technological knowledge) influence CCOs adoption of complementary technologies? - Which organizational dynamics (e.g. technical operations, management practices, and departmental processes) are associated with the management of complementary

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Table 2 (*continued*)

Axes of Discussion	Literature Insights	Prospective Research Questions
	organizational management via advanced technologies (Jahromi & Ghazinoory, 2024; Kamariotou et al., 2021; Kefi et al., 2024; Kosmopoulos & Styliaras, 2018; Li et al., 2022; Nova et al., 2023; Tim et al., 2020; Torres-González et al., 2021; Trocin et al., 2023; Wei & Guan, 2021; Zhang et al., 2024; Zhao et al., 2023).	technologies within CCOs? - In which ways do industry domains diverge in the management of complementary technologies? Are there transversal characteristics (e.g. organizational dynamics and stakeholder participation)?
5.Intelligent Optimization (cont.)	Notwithstanding, despite the advantages conferred by these complementary technologies - particularly in process automation and data-driven decision-making – there is an absence of research aimed at the intelligent optimization of CCO-oriented management systems.	- Which underlying reasons (e.g. financial viability, industry-specific requirements and technical challenges) hinder the integration of advanced technologies within CCO-oriented management systems?
6. Innovation Initiatives	Envisioning organizational growth and technological innovation, CCOs are encouraged to (i) invest in training programs, (ii) foster inter-organizational partnerships, and (iii) pursue collaborative initiatives, such as practice-based networks, technological incubators, and communities of practice (Gombault et al., 2016; Kefi et al., 2024). Furthermore, promoting knowledge transference and co-learning experiences may be ideal, as CCOs reveal apprehensiveness to "*adopt a digital technology spontaneously and will wait for another similar organization to try it first and provide good feedback*" (Gombault et al., 2016, p. 5136).	- How are training programs implemented across industry domains? Which competencies and skills do they prioritize? - Which inter-organizational partnerships (e.g. with universities, governmental agencies or private enterprises) are most prevalent amongst CCOs? - How do CCOs participate in collaborative initiatives (e.g. practice-based networks, technological incubators, and communities of practice)? Are these available across industry domains? What are their primary areas of focus? - Which drivers and inhibitors influence CCOs' involvement in inter-organizational partnerships and collaborative initiatives?

purposes (O'Connor, 2024; Hesmondhalgh, 2019; Komorowski & Lewis, 2023; European CommissionIzsak, 2021; Li, 2020; Oyekunle & Sirayi, 2018; UNESCO, 2022; Ernst & Young, 2015), this framework integrates a Partnership Management Module and an External Initiatives Module, devised to operationalize and elevate these functions.

Additionally, the framework's modular configuration is intentionally non-exhaustive, reflecting the environmental complexity and structural limitations of CCOs, particularly their resource scarcity (Li et al., 2022; Kamariotou et al., 2021; Tim et al., 2020; Walmsley, 2016; Gombault et al., 2016; Center for Arts Management and Technology, 2011). For instance, whereas larger organizations may require highly-specialized management modules, smaller institutions could instead benefit from wider modular architectures - e.g. a Financial Management Module that encompasses both Sales Management and Accounting - as these may decrease redundancy, technical efforts and cognitive loads.

Table 3
Design Agenda.

Transversal Themes	Strategic Recommendations
Innovative System Functionalities	- **Internal Management Module** – As to incentivize the creation and formalization of internal directives, institutional parameters and organizational processes, this module would aggregate institutional documents and regulations, alongside instruction manuals for standard processes (e.g. creating user profiles, editing projects, updating inventory). - **Technological Management Module** – It could simultaneously operate as (i) a help desk, devised for IT assistance, as well as (ii) a repository for IT-related documentation (e.g. IT policies, procedural guidelines and maintenance protocols). - **Project Management Module** – Functioning as a log of ongoing projects, this module would thoroughly describe all project directives (e.g. prerequisites, deliverables, budget allocations, schedules, team structures, and production tools), and include a task monitorization functionality, by itemizing project activities and displaying their progression statuses (e.g., awaiting approval, in progress, or completed). - **Knowledge Management Module** –This module would consolidate performance assessments from prior projects and organizational decisions, systematically documenting instances of inefficiencies, setbacks, and operational bottlenecks. These historical insights would then be synthesized into actionable directives, thereby informing decision-making processes and contributing to process optimization. - **Team Management Module** – Centered on individual user profiles, this module would streamline the creation and coordination of interdisciplinary teams by systematically mapping employees' roles, capabilities, and ongoing project assignments. - **Human Resource Module** – This module would structurally support the management of both permanent and temporary personnel. Additionally, it would refine recruitment processes by (i) archiving professional records from previous temporary employees, (ii) highlighting talent gaps within specific departments or projects, and (iii) displaying available recruitment budgets. - **Partnership Management Module** – Designed to catalogue ongoing and past partnerships, it would be interconnected with a Project Management Module and feature relevant partner information, detailed descriptions of collaborative projects, task distributions and assigned personnel. - **External Initiatives Module** – As to foster CCO's participation in collaborative initiatives (e.g. practice-based networks, technological incubators, and communities of practice), this module would list ongoing initiatives, accompanied by their description, a registry of involved organizations, and an activity calendar. - **Learning and Training Module** – Aimed at promoting interdisciplinary learning and enhancing professional skills, this module would provide digital courses, and in-person training initiatives tailored to CCO's personnel. Depending on budgetary constraints, this feature would alternatively include a curated list of free online courses. Furthermore, the module would incorporate instructional materials on the management system itself, thereby promoting user acceptance. - **Marketing, Social Media, and Community Management Module** – By synthesizing insights derived from digital platforms (e.g. engagement metrics, audience feedback and consumer complaints), this module would optimize data-driven marketing decisions, content distribution

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Table 3 (*continued*)

Transversal Themes	Strategic Recommendations
	strategies, and community management approaches. For social media management, the module could feature a scheduling interface with a calendar-based view, streamlining the coordination and automation of social media publications. Additionally, it could integrate a crowdsourcing functionality, as to manage co-produced and user-generated content (e.g., transcriptions, photo-tagging and georeferencing). - **Asset Management Module** – This module would serve as a centralized repository and inventory of organizational assets (e.g. historical artifacts, visual artworks, digital files, artistic equipment, and exhibition spaces), listing their IDs, descriptions, provenance, location and availability status. For instance, unavailable assets—whether allocated to concurrent projects or temporarily loaned to external institutions—could be automatically filtered out, thereby facilitating curatorial activities and project management. In addition, the module could be interconnected with national and international databases, as to foster inter-organizational cooperation. - **IP Management Module** – It would contain all documentation, including ownership records, licensing agreements, and copyright statuses, pertaining to the CCO's institutional identity (e.g., name and logo) and proprietary assets (e.g., audiovisual productions, literary works, handcrafted artifacts, and designs). To facilitate regulatory compliance and information retrieval, the module could feature a curated repository of national and international IP laws. Furthermore, this module could be interconnected with a Legal Management Module, to track ongoing ownership and copyright disputes, as well as with a Financial Management Module to oversee licensing fees and expediate royalty payments. - **Legal Management Module** – Designed to centralize the CCO's legal documentation (e.g. employment contracts, funding contracts, and licensing agreements), this module would streamline legal procedures, supervise contractual obligations, and protect organizational and employment rights. Additionally, it could feature a section dedicated to managing ownership disputes—especially those concerning commissioned works, where the attribution of IP rights may be contested between the organization and the creator—as well as copyright infringements, which often necessitate legal intervention. - **Financial Management Module** – Considering CCOs' upsurge of multifaceted revenue streams, this module would support financial management by monitoring commercial transactions (e.g., merchandising, commissions, product sales, and ticketing), externally sourced funding (e.g., grants and subsidies), and royalty payments. Additionally, it would (i) record financial transactions to optimize tax reporting and fiscal accountability, (ii) manage payroll processing (in coordination with a Human Resource Management Module), and (iii) integrate financial planning tools such as budget worksheets and pricing frameworks (interlinked with a Project Management Module).
New Approaches to System Design New Approaches to System Design (Cont.)	- **Resource Alignment**– Prior to system development, CCO's should evaluate their organizational structures and capabilities (e.g. financial resources, human capital and technological infrastructure) and establish a project plan, ensuring the strategic alignment and allocation of resources for the system's design, development, and integration. Additionally, system designers (e.g., IT specialists), alongside CCO stakeholders, must rigorously assess the system's technical requirements and guarantee its cost-efficiency and long-term sustainability. - **System Standards** – To maintain operational coherence, designers must preemptively delineate system standards—including operating systems, programming languages, metadata frameworks, and storage protocols— ensuring uniformity across all management platforms, as the coexistence of heterogeneous technical frameworks exacerbates maintenance difficulties. Moreover, organizations must determine whether IT management will be conducted internally or through outsourcing, as discrepancies in maintenance protocols and documentation could pose significant integration challenges. - **Centralized Database** – As to circumvent fragmented storage, establishing a centralized database would be paramount. This approach would accelerate workflows by reducing the efforts associated with information search and retrieval. Complementarily, the system should incorporate external data inputs from digital platforms (e.g. social media and e-commerce). - **Artifactual Symbolism** – Cultural artifacts embody an array of symbolic attributes, which extend far beyond their material properties. These attributes significantly impact representation standards, dictating the use of specialized terminologies and classification frameworks, which may shift in response to evolving academic conceptualizations. Nonetheless, these conceptualizations are not universally representative. Therefore, system designers must be guided by industry professionals to ensure that artifactual symbolism is acknowledged with ethical rigor, fostering a culturally respectful and context-sensitive approach to system design and development. - **Interface Design** – System interfaces must be designed according to the CCOs' organizational structures and workflows, warranting cross-departmental accessibility and connectivity. Moreover, uniformity in stylistic elements and visualization representations must be prioritized, featuring intuitive interfaces and interactive controls that enhance user experience. - **Collaborative Interdisciplinary Design** – In recognition of CCOs' unique organizational environments and operational requirements, system design must be informed by a collaborative interdisciplinary approach. Hence, system designers must synergically collaborate with industry professionals to create technological solutions that uphold the CCO's institutional identity, core objectives and proprietary assets.
Intelligent System Optimization	- For Financial Management, **AI, Big Data Analytics and ML** technologies could support a pricing analysis functionality, by evaluating competitor trends and contributing to the CCO's market positioning and financial sustainability. - For Knowledge Management, **AI** could sustain an automated reporting functionality, that would extract information from previous projects, identify improvement opportunities, and compile relevant insights into preconfigured report templates. - For Team Management, **AI** could generate recommendations for team composition and role assignment, drawing on previous project reports and personnel competencies. - For Project Management, **AI, Data Analytics and ML** technologies could uphold a timeframe recommendation feature, through predictive modeling. This functionality would predict optimal timeframes and notify users if task durations approach critical thresholds, thereby preserving output quality.

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Table 3 (*continued*)

Transversal Themes	Strategic Recommendations
	- For Asset Management, **IoT** technologies could support an institutional tracking feature, providing real-time monitorization of infrastructural conditions and asset locations.

Ultimately, these recommendations serve as insightful propositions meant to inspire new unified system architectures and functionalities, as well as supplement and optimize existing ones.

5. Conclusion

While technological advancements are increasingly empowering CCOs, academic literature had not yet systematically analysed the deployment of management systems within these institutions. In response, this SLR surveyed the existing literature and uncovered pivotal insights that can advance industry-convergent management solutions and foster the sustainable growth of the cultural and creative sectors.

For instance, the findings revealed a growing interest in this field, evidenced by an upward publication rate. Nonetheless, three research patterns revealed lacunae in current literature, concerning an uneven prominence of particular industry domains, geographical backgrounds and managerial areas. Notably, literature scarcely referenced organization-wide integrated management systems, instead focusing on fragmented solutions tailored to specific departments and processes. Even then, within the system-oriented studies, various managerial domains (e.g. human resource management and financial management) remained underrepresented.

Another pivotal insight concerns the relationship between the foundational dynamics of CCOs and the prerequisites for system development. Specifically, CCO-oriented systems must be designed to reflect the organizational structures, resource availability, and institutional ethos of these organizations, all while maintaining the adaptability to accommodate the inherent diversity and the symbolic nature of their assets. These stringent system requirements, combined with the technical challenges of system development, integration and maintenance, serve as major impediments to the adoption of management systems and precludes the viability of off-the-shelf solutions.

In addition, the literature revealed a discrepancy between the deployment of advanced technologies in cultural and creative production and their, comparatively minimal, integration in management operations. Correspondingly, existing studies provided limited insights into how advanced technologies can contribute to the intelligent optimization of CCO-oriented management systems.

Albeit displaying significant findings, this study recognizes four research limitations.

Firstly, there is a pronounced absence of consistent terminology throughout the literature. Specifically, the terms “management system” and “cultural and creative industries” are inconsistently employed, often alternating with other nomenclatures. To mitigate this constraint, the research query was deliberately designed to encapsulate a broad spectrum of relevant terminologies, without compromising the research scope.

Secondly, as to ensure academic rigor, the SLR exclusively relied on peer-reviewed journal articles, which may have inadvertently excluded insights from other sources. Nonetheless, foundational insights extracted from books, conference proceedings and grey literature were integrated in the Introduction, thereby enabling the identification of the literature trends and theoretically contextualizing this research.

Thirdly, the reviewed studies asymmetrically represented plural geographical backgrounds and sociocultural contexts. Whilst this may be attributable to the third eligibility criterion - restricting the SLR to English-language publications – future research should integrate multilingual studies to foster equitable technological solutions, tailored to the heterogeneous challenges and requirements of different cultural ecosystems.

Finally, this research adopts an industry-convergent approach, privileging a macroscopic analysis of Cultural Domains, as delineated by the Framework for Cultural Statistics Domains (UNESCO Institute for Statistics, 2009). Whilst this may have omitted technical, managerial, and operational dynamics, inherent to varying organizational typologies, it enabled the extrapolation of cross-sectoral insights, which were instrumental for the formulation of the Design Agenda.

Despite these limitations, this study advances four major contributions to this research field.

First, it provides a systematic consolidation of the literature surrounding management systems deployed within CCOs, situating them in relation to the organizational structures and operational processes they are expected to accommodate. By synthesizing insights from heterogenous disciplinary and industry domains, this study delivers a unified and coherent representation of CCO’s organizational environments, departmental configurations and structural vulnerabilities, thereby establishing a new theoretical foundation to inform subsequent empirical research and comparative studies.

Second, the study introduces two innovative and interdisciplinary frameworks. The first delineates a series of Research Trajectories, intended to guide future exploratory studies and foster new synergies between industry professionals and academic researchers. The second constitutes a tripartite Design Agenda, meant to encapsulate the organizational departments, workflows, and industry-convergent requirements of CCOs. This Agenda not only integrates the primary managerial domains of CCOs (e.g. Project Management, Asset Management and Financial Management) but also foregrounds underrepresented functional areas, such as Internal Management, Learning and Training, and Legal Management. Engineered upon the principles of modularity, variability and customizability, the Design Agenda intends to serve as an instrumental blueprint for a, industry-tailored and CCO-oriented, integrated management system, capable of amplifying the institution’s value preposition, market positioning and long-term sustainability.

Third, by acknowledging the cultural and creative sectors as early-adopters and entrepreneurial thinkers (Li, 2020; Salder, 2020), this study yields insights that may be transversally adapted across industry sectors. Specifically, it relays recommendations within the Design Agenda that are applicable to SMEs operating in similarly dynamic, informal, flexible and experimental environments.

Lastly, this review reveals a lacuna in the application of advanced technologies for the optimization of CCO-oriented management systems, privileging instead their role in creative production and audience engagement (Jahromi & Ghazinoory, 2024; Kamariotou et al., 2021; Kefi et al., 2024; Li et al., 2022; Tim et al., 2020; Trocin et al., 2023). Accordingly, this study advocates for new advancements in this topic and foregrounds the strategic integration of advanced technologies into multiple managerial domains and operational processes of CCOs, as presented in the “Intelligent System Optimization” section of the Design Agenda.

CRediT authorship contribution statement

Catarina Ferraz: Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Filipe Montargil:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Vitor Santos:** Writing – review & editing, Validation, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

The authors did not utilize generative AI or AI-assisted technologies

during the preparation of this article.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Cultural Domains and Transversal Domains, adapted from the Framework for Cultural Statistics Domains (UNESCO Institute for Statistics, 2009)

Domains		Examples
Cultural Domains	A. Cultural and Natural Heritage	Museums, Archeological Sites, Historical Places and Cultural Landscapes
	B. Performance and Celebration	Performing Arts, Music, Festivals, Fairs and Feasts
	C. Visual Arts and Crafts	Fine Arts, Photography and Crafts
	D. Books and Press	Books, Newspapers, Magazines, Libraries and Book Fairs
	E. Audio-visual and Interactive Media	Film, Video, TV, Radio, Live Streaming, Podcasts and Video Games
	F. Design and Creative Services	Fashion | Graphic | Interior | Landscape Design, Architectural Services and Advertising Services
Transversal Domains	Intangible Cultural Heritage	Oral Traditions, Expressions, Rituals, Languages and Social Practices
	Education and Training	Cultural Education Activities
	Archiving and Preserving	Archives, Collections and Repositories
	Equipment and Supporting Materials	Musical Instruments, Cameras and Printing Machines and IT Equipment

Appendix B. Bibliographical Matrix

Year	Article Title	Journal	Methodological Approach	Cultural Domain (UNESCO Institute for Statistics, 2009)	Citation
2024	From Superman to Garfield: Four scenarios regarding the effects of industry 4.0 on animation companies	Technology in Society	Multi-Case Study	Audio-visual and Interactive Media	Jahromi and Ghazinoory (2024)
2024	Real-time sensor networks based on genetic algorithms application in the analysis of innovative data in cultural industry management	Measurement: Sensors	Mixed Methods	Interdisciplinary	Zhang et al. (2024)
2024	Toward museum transformation: From mediation to social media-tion and fostering omni-visit experience	Information & Management	Mixed Methods	Cultural and Natural Heritage	Kefi et al. (2024)
2023	A Blockchain-Based cryptographic interaction method of digital museum collections	Journal of Cultural Heritage	Multi-Case Study	Cultural and Natural Heritage	Zhao et al. (2023)
2023	A knowledge management system for sharing knowledge about cultural heritage projects	Journal of Cultural Heritage	Design Science Research	Cultural and Natural Heritage	Nova et al. (2023)
2023	Compromises and compromising: Management accounting and decision-making in a creative organisation	Management Accounting Research	Single-Case Study	Performance and Celebration	Trevisan and Mouritsen (2023)
2023	Machine Learning (ML) diffusion in the design process: A study of Norwegian design consultancies	Technological Forecasting & Social Change	Multi-Case Study	Design and Creative Services	Trocin et al. (2023)
2022	Computing for Chinese Cultural Heritage	Visual Informatics	Multi-Case Study	Cultural and Natural Heritage	Li et al. (2022)
2022	Effects of the use of digital technologies on the performance of firms in a developing country: are there differences between creative and manufacturing industries?	International Journal of Information Systems and Project Management	Quantitative	Interdisciplinary	Seclen-Luna et al. (2022)
2022	Project governance interface and owner organizational identity: The Venice Biennale case	International Journal of Project Management	Single-Case Study	Interdisciplinary	Pisotska et al. (2022)
2021	Digital management focused on the preventive maintenance of World Heritage Sites	Automation in Construction	Single-Case Study	Cultural and Natural Heritage	(Torres-Gonzalez et al., 2021)
2021	Path and Mechanism of Blockchain Embedded in Innovation Management of Cultural and Creative Industrial Park	Discrete Dynamics in Nature and Society	Mixed Methods	Interdisciplinary	Wei and Guan (2021)
2021	Strategic planning for virtual exhibitions and visitors' experience: A multidisciplinary approach for museums in the digital age	Digital Applications in Archaeology and Cultural Heritage	Mixed Methods	Cultural and Natural Heritage	Kamariotou et al. (2021)
2020	A web repository for geo-located 3D digital cultural heritage models	Digital Applications in Archaeology and Cultural Heritage	Design Science Research	Cultural and Natural Heritage	Nishanbaev (2020)
2020	Back to the future: Actualizing technology affordances to transform Emperor Qin's terracotta warriors Museum	Information & Management	Single-Case Study	Cultural and Natural Heritage	Tim et al. (2020)
2020	The digital transformation of business models in the creative industries: A holistic framework and emerging trends	Technovation	Multi-Case Study	Interdisciplinary	Li (2020)

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Year	Article Title	Journal	Methodological Approach	Cultural Domain (UNESCO Institute for Statistics, 2009)	Citation
2019	Communicating Museum Collections Information Online: Analysis of the Philosophy of Communication Extending the Constructivist Approach	Journal on Computing and Cultural Heritage	Quantitative	Cultural and Natural Heritage	Gil-Fuentetaja and Economou (2019)
2018	A survey on developing personalized content services in museums	Pervasive and Mobile Computing	Mixed Methods	Cultural and Natural Heritage	Kosmopoulos and Styliaras (2018)
2018	Cultural heritage digitization and related intellectual property issues	Journal of Cultural Heritage	Mixed Methods	Cultural and Natural Heritage	Borissova (2018)
2016	From arts marketing to audience enrichment: How digital engagement can deepen and democratize artistic exchange with audiences	Poetics	Mixed Methods	Performance and Celebration	Walmsley (2016)
2016	ICT adoption in heritage organizations: Crossing the chasm	Journal of Business Research	Multi-Case Study	Cultural and Natural Heritage	Gombault et al. (2016)
2016	ICT capabilities for supporting collaborative work on business processes within the digital content industry	Computers in Industry	Multi-Case Study	Audio-visual and Interactive Media	González-Rojas et al. (2016)
2015	Systems integration of heterogeneous cultural heritage information systems in museums: a case study of the National Palace Museum	International Journal on Digital Libraries	Single-Case Study	Cultural and Natural Heritage	Wu (2015)

Data availability

Data will be made available on request.

References

Alacovska, A. (2018). Informal creative labour practices: A relational work perspective. *Human Relations, 71*(12), 1563–1589. https://doi.org/10.1177/0018726718754991

Alnasser, N. S., & Yi, L. J. (2023). Strategies applied by different arts and cultural organizations for their audience development: A comparative review. *Heliyon, 9*(5), Article e15835. https://doi.org/10.1016/j.heliyon.2023.e15835

Anantrasirichai, N., & Bull, D. (2021). Artificial intelligence in the creative industries: A review. *Artificial Intelligence Review, 55*(1), 589–656. https://doi.org/10.1007/s10462-021-10039-7

Bérubé, J., & Gauthier, J. (2021). Managing projects in creative industries: A compromise between artistic and project management values. *Creative Industries Journal, 16*(1), 76–95. https://doi.org/10.1080/17510694.2021.1979278

Borissova, V. (2018). Cultural heritage digitization and related intellectual property issues. *Journal of Cultural Heritage, 34*, 145–150. https://doi.org/10.1016/j.culher.2018.04.023

Byrnes, W. J. (2009). *Management and the arts* (4nd ed.). Taylor & Francis.

Center for Arts Management and Technology. (2011). *Arts & IT: Technology adoption and implementation in arts organizations*. Carnegie Mellon University's Center for Arts Management Technology. https://amt-lab.org/blog/2011/01/technology-adoption-and-implementation-in-arts-organizations.

Chandra, L., Seidel, S., & Gregor, S. (2015). Prescriptive knowledge in IS research: Conceptualizing design principles in terms of materiality, action, and boundary conditions. In *48th Hawaii international conference on system sciences*. https://doi.org/10.1109/hicss.2015.485

Chapman, M. (2015). Managing collections or managing content?: The evolution of museum collections management systems. In S. Macdonald, & H. Rees Leahy (Eds.), *The international handbooks of museum studies* (pp. 267–292). https://doi.org/10.1002/9781118829059.wbihms212

Choi, J., & Fiorino-Iannace, G. (2018). 8. Information management systems at the metropolitan museum of art. In C. M. Angel, & C. Fuchs (Eds.), *Organization, representation and description through the digital age: Information in libraries, archives and museums* (pp. 117–129). https://doi.org/10.1515/9783110337419-009

Chughtai, H., & Young, A. G. (2024). Decoloniality and information systems: Making local contexts relevant to IS research. *Information Systems Journal, 35*(4), 1285–1293. https://doi.org/10.1111/isj.12579

Cirella, S. (2021). Managing collective creativity: Organizational variables to support creative teamwork. *European Management Review, 18*(4), 404–417. https://doi.org/10.1111/emre.12475

Collyer, S., Warren, C. M., Hemsley, B., & Stevens, C. (2010). Aim, fire, aim—project planning styles in dynamic environments. *Project Management Journal, 41*(4), 108–121. https://doi.org/10.1002/pmj.20199

DeFillippi, R. (2013). Managing project-based organization in creative industries. In C. Jones, M. Lorenzen, & J. Sapsed (Eds.), *The Oxford handbook of creative industries*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199603510.013.024.

DeVereaux, C. (2019). Arts management: Reflections on role, purpose, and the complications of existence. In W. J. Byrnes, & A. Brkic (Eds.), *The routledge companion to arts management* (pp. 15–25). Routledge.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Douros, P., Papageorgiou, K., Milioris, K., Panagiotakopoulou, K., & Kaldis, P. (2023). Digital transformation using marketing strategies in cultural organizations and diffusion of knowledge through technology, a systematic literature review. *Transnational Marketing Journal, 11*, 199–216. https://doi.org/10.58262/tmj.v11i1.1014

Ernst & Young. (2015). *Cultural times: The first global map of cultural and creative industries*. EYGM Limited.

Ferraz, C. (2023). Rethinking cultural democratization projects - Proposal of an inclusive framework for underdeveloped environments [Master's Thesis, Nova University of Lisbon] http://hdl.handle.net/10362/150906.

Galloway, S., & Dunlop, S. (2007). A critique of definitions of the cultural and creative industries in public policy. *International Journal of Cultural Policy, 13*(1), 17–31. https://doi.org/10.1080/10286630701201657

Germain-Thomas, P. (2018). Arts marketing: A new marketing art. In C. DeVereaux (Ed.), *Arts and cultural management: Sense and sensibilities in the state of the field* (pp. 152–166). Routledge Research in Creative and Cultural Industries Management.

Gessa, A., Jiménez, A., & Sancha, P. (2023). Exploring ERP systems adoption in challenging times. Insights of SMEs stories. *Technological Forecasting and Social Change, 195*, Article 122795. https://doi.org/10.1016/j.techfore.2023.122795

Gil-Fuentetaja, I., & Economou, M. (2019). Communicating museum collections information online: Analysis of the philosophy of communication extending the constructivist approach. *Journal on Computing and Cultural Heritage, 12*(1), 1–16. https://doi.org/10.1145/3283253

Gohoungodji, P., & Amara, N. (2022). Art of innovating in the arts: Definitions, determinants, and mode of innovation in creative industries, a systematic review. *Review of Managerial Science, 17*(8), 2685–2725. https://doi.org/10.1007/s11846-022-00597-7

Gombault, A., Allal-Chérif, O., & Décamps, A. (2016). ICT adoption in heritage organizations: Crossing the chasm. *Journal of Business Research, 69*(11), 5135–5140. https://doi.org/10.1016/j.jbusres.2016.04.093

González-Rojas, O., Correal, D., & Camargo, M. (2016). ICT capabilities for supporting collaborative work on business processes within the digital content industry. *Computers in Industry, 80*, 16–29. https://doi.org/10.1016/j.compind.2016.04.004

Gregor, S., Kruse, L. C., & Seidel, S. (2020). Research perspectives: The anatomy of a design principle. *Journal of the Association for Information Systems, 21*, 1622–1652. https://doi.org/10.17705/1jais.00649

Hagenhoff, S. (2016). Systems analysis as a basis for designing IT in the media industry. In A. Lugmayr, E. Stojmenova, K. Stanoevska, & R. Wellington (Eds.), *Information systems and management in media and entertainment industries*. https://doi.org/10.1007/978-3-319-49407-4

Hesmondhalgh, D. (2019). *The cultural industries*. SAGE Publications Limited.

Hodgson, D., & Briand, L. (2013). Controlling the uncontrollable: 'agile' teams and illusions of autonomy in creative work. *Work, Employment & Society, 27*(2), 308–325. https://doi.org/10.1177/0950017012460315

Holzmann, V., & Mazzini, L. (2020). Applying project management to creative industries: The relationship between leadership style and project success. *Journal of Organizational Culture, Communications and Conflict, 24*(1), 1.

European Commission, Izsak, K. (2021). *Advanced technologies for industry: Sectoral watch: Technological trends in the creative industries*. European Union.

Jahromi, G. S., & Ghazinoory, S. (2024). From superman to garfield: Four scenarios regarding the effects of industry 4.0 on animation companies. *Technology in Society, 77*, Article 102511. https://doi.org/10.1016/j.techsoc.2024.102511

Jones, C., Svejenova, S., Pedersen, J. S., & Townley, B. (2016). Misfits, mavericks and mainstreams: Drivers of innovation in the creative industries. *Organization Studies, 37*(6), 751–768. https://doi.org/10.1177/0170840616647671

Kamariotou, V., Kamariotou, M., & Kitsios, F. (2021). Strategic planning for virtual exhibitions and visitors' experience: A multidisciplinary approach for museums in

the digital age. *Digital Applications in Archaeology and Cultural Heritage, 21*, Article e00183. https://doi.org/10.1016/j.daach.2021.e00183
Kargas, A., & Loumos, G. (2023). Cultural industry's strategic development: Reaching international audience by using virtual reality and augmented reality technologies. *Heritage, 6*(6), 4640–4652. https://doi.org/10.3390/heritage6060246
Kefi, H., Besson, E., Zhao, Y., & Farran, S. (2024). Toward museum transformation: From mediation to social media-tion and fostering omni-visit experience. *Information & Management, 61*(1), Article 103890. https://doi.org/10.1016/j.im.2023.103890
Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering (EBSE technical report. EBSE-2007-01)*. Keele University. Version 2.3.
Koch, F., Hoellen, M., Konrad, E. D., & Kock, A. (2023). Innovation in the creative industries: Linking the founder's creative and business orientation to innovation outcomes. *Creativity and Innovation Management, 32*(2), 281–297. https://doi.org/10.1111/caim.12554
Komorowski, M., & Lewis, J. (2023). The creative and cultural industries: Towards sustainability and recovery. *Sustainability, 15*(13), 9923. https://doi.org/10.3390/su15139923
Kosmopoulos, D., & Styliaras, G. (2018). A survey on developing personalized content services in museums. *Pervasive and Mobile Computing, 47*, 54–77. https://doi.org/10.1016/j.pmcj.2018.05.002
Landoni, P., Dell'Era, C., Frattini, F., Petruzzelli, A. M., Verganti, R., & Manelli, L. (2020). Business model innovation in cultural and creative industries: Insights from three leading Mobile gaming firms. *Technovation, 92–93*, Article 102084. https://doi.org/10.1016/j.technovation.2019.102084
Laudon, J. P., & Laudon, K. C. (2017). *Management information systems: Managing the digital firm* (15th ed.). Pearson Education Limited.
Li, F. (2020). The digital transformation of business models in the creative industries: A holistic framework and emerging trends. *Technovation, 92–93*, Article 102012. https://doi.org/10.1016/j.technovation.2017.12.004
Li, M., Wang, Y., & Xu, Y. (2022). Computing for Chinese cultural heritage. *Visual Informatics, 6*(1), 1–13. https://doi.org/10.1016/j.visinf.2021.12.006
Macdonnell, J., & Bereson, R. (2019). Arts management and its contradictions. In W. J. Byrnes, & A. Brkic (Eds.), *The routledge companion to arts management* (pp. 3–14). Routledge.
Müller-Wienbergen, F., Müller, O., Seidel, S., & Becker, J. (2011). Leaving the beaten tracks in creative work – A design theory for systems that support convergent and divergent thinking. *Journal of the Association for Information Systems, 12*(11), 714–740. https://doi.org/10.17705/1jais.00280
Nishanbaev, I. (2020). A web repository for geo-located 3D digital cultural heritage models. *Digital Applications in Archaeology and Cultural Heritage, 16*, Article e00139. https://doi.org/10.1016/j.daach.2020.e00139
Norling, S. (2018). 17. Bringing the archives out of the art museum: Local metadata planning within a global context. In C. M. Angel, & C. Fuchs (Eds.), *Organization, representation and description through the digital age: Information in libraries, archives and museums* (pp. 255–268). Walter de Gruyter GmbH. https://doi.org/10.1515/9783110337419-018.
Nova, N. A., González, R. A., Beltrán, L. C., & Nieto, C. E. (2023). A knowledge management system for sharing knowledge about cultural heritage projects. *Journal of Cultural Heritage, 63*, 61–70. https://doi.org/10.1016/j.culher.2023.07.013
Ochai, O. (2022). New opportunities and challenges for inclusive cultural and creative industries in the digital environment. In UNESCO (Ed.), *Re | shaping policies for creativity: Addressing culture as a global public good* (pp. 91–115). UNESCO Publishing.
O'Connor, J. (2024). *Culture is not an industry: Reclaiming art and culture for the common good*. Manchester University Press.
Oksanen, A., Cvetkovic, A., Akin, N., Latikka, R., Bergdahl, J., Chen, Y., & Savela, N. (2023). Artificial intelligence in fine arts: A systematic review of empirical research. *Computers in Human Behavior Artificial Humans, 1*(2), Article 100004. https://doi.org/10.1016/j.chbah.2023.100004
Oracle. (n.d.). Media & entertainment | industries. Retrieved September 5, 2025, from https://www.oracle.com/media-entertainment/.
Oyekunle, A., & Sirayi, M. (2018). The role of creative industries as a driver for a sustainable economy: A case of South Africa. *Creative Industries Journal, 11*(3), 225–244. https://doi.org/10.1080/17510694.2018.1480850
Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T., Mulrow, C. D., Shamseer, L., Tetzlaff, J., Akl, E. A., Brennan, S., Chou, R., Glanville, J., Grimshaw, J., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ, n71*. https://doi.org/10.1136/bmj.n71
Pisotska, V., Winch, G., & Sergeeva, N. (2022). Project governance interface and owner organizational identity: The venice biennale case. *International Journal of Project Management, 40*(6), 658–670. https://doi.org/10.1016/j.ijproman.2022.07.001
Rahimli, N., & See-To, E. W. K. (2018). Exploring open innovation technologies in creative industries: Systematic review and future research agenda. In *Advances in intelligent systems and computing* (pp. 71–85). https://doi.org/10.1007/978-3-319-74980-8_7
Salder, J. (2020). The creative business: Enterprise development in the arts-based creative industries. *Creative Industries Journal, 14*(1), 63–80. https://doi.org/10.1080/17510694.2020.1789414
SAP. (n.d.). Media, sports, and entertainment industry software. Retrieved September 5, 2025, from https://www.sap.com/portugal/industries/media-sports-entertainment.html.
Sauer, P. C., & Seuring, S. (2023). How to conduct systematic literature reviews in management research: A guide in 6 steps and 14 decisions. *Review of Managerial Science, 17*(5), 1899–1933. https://doi.org/10.1007/s11846-023-00668-3
Seclen-Luna, J. P., Vergara, R. I. C., & Valladares, H. L. (2022). Effects of the use of digital technologies on the performance of firms in a developing country: Are there differences between creative and manufacturing industries? *International Journal of Information Systems and Project Management, 10*(1), 73–91. https://doi.org/10.12821/ijispm100104
Seidel, S. (2009). Toward a theory of managing creativity-intensive processes: A creative industries study. *Information Systems and e-Business Management, 9*(4), 407–446. https://doi.org/10.1007/s10257-009-0123-7
Stahl, J., & Tröndle, M. (2019). Toward a practical theory of managing the arts. In C. DeVereaux (Ed.), *Arts and cultural management* (pp. 247–266). Routledge Research in Creative and Cultural Industries Management.
Svejvig, P. (2013). Using institutional theory in enterprise systems research. *International Journal of Enterprise Information Systems, 9*(1), 1–30. https://doi.org/10.4018/jeis.2013010101
Throsby, D. (2008). Modelling the cultural industries. *International Journal of Cultural Policy, 14*(3), 217–232. https://doi.org/10.1080/10286630802281772
Tim, Y., Ouyang, T., & Zeng, D. (2020). Back to the future: Actualizing technology affordances to transform emperor Qin's terracotta warriors Museum. *Information & Management, 57*(8), Article 103271. https://doi.org/10.1016/j.im.2020.103271
Todorovic, M., & Bakir, A. (2016). *Rethinking strategy for creative industries: Innovation and interaction*. Routledge.
Torres-González, M., Prieto, A., Alejandre, F., & Blasco-López, F. (2021). Digital management focused on the preventive maintenance of World Heritage Sites. *Automation in Construction, 129*, Article 103813. https://doi.org/10.1016/j.autcon.2021.103813
Tranfield, D. R., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-Informed management knowledge by means of systematic review. *British Journal of Management, 14*(3), 207–222. https://doi.org/10.1111/1467-8551.00375
Trevisan, P., & Mouritsen, J. (2023). Compromises and compromising: Management accounting and decision-making in a creative organisation. *Management Accounting Research, 60*, Article 100839. https://doi.org/10.1016/j.mar.2023.100839
Trocin, C., Stige, Å., & Mikalef, P. (2023). Machine Learning (ML) diffusion in the design process: A study of Norwegian design consultancies. *Technological Forecasting and Social Change, 194*, Article 122724. https://doi.org/10.1016/j.techfore.2023.122724
UNESCO. (2022). *Re | shaping policies for creativity: Addressing culture as a global public good*. UNESCO Publishing.
UNESCO Institute for Statistics. (2009). *The 2009 UNESCO framework for cultural statistics (FCS)*. UNESCO.
UNESCO, UNDP. (2013). *Creative economy report 2013: Widening local development pathways*. UNESCO.
UNESCO, & The World Bank. (2021). *Cities, culture and creativity: Leveraging culture and creativity for sustainable urban development and inclusive growth*. UNESCO Publishing.
Valacich, J. S., & George, J. F. (2020). *Modern systems analysis and design*. UK: Pearson.
Wallace, M., Poulopoulos, V., Antoniou, A., & López-Nores, M. (2023). *Big data analytics for cultural heritage*. MDPI.
Walmsley, B. (2016). From arts marketing to audience enrichment: How digital engagement can deepen and democratize artistic exchange with audiences. *Poetics, 58*, 66–78. https://doi.org/10.1016/j.poetic.2016.07.001
Walter, C. (2015). *Arts management: An entrepreneurial approach*. Routledge.
Wei, H., & Guan, S. (2021). Path and mechanism of blockchain embedded in innovation management of cultural and creative industrial park. *Discrete Dynamics in Nature and Society*, 1–12. https://doi.org/10.1155/2021/9574223, 2021.
Wu, S. (2015). Systems integration of heterogeneous cultural heritage information systems in museums: A case study of the national palace museum. *International Journal on Digital Libraries, 17*(4), 287–304. https://doi.org/10.1007/s00799-015-0154-2
Zhang, B., Yang, Z., Zhang, J., & Xu, Q. (2024). Real-time sensor networks based on genetic algorithms application in the analysis of innovative data in cultural industry management. *Measurement Sensors, 32*, Article 101073. https://doi.org/10.1016/j.measen.2024.101073
Zhao, L., Zhang, J., Jing, H., Wu, J., & Huang, Y. (2023). A blockchain-based cryptographic interaction method of digital museum collections. *Journal of Cultural Heritage, 59*, 69–82. https://doi.org/10.1016/j.culher.2022.11.001

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