UNLOCKING THE POTENTIAL OF DIGITAL TRANSFORMATION IN THEATER: SCENA'S JOURNEY

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Unlocking the potential of digital transformation in theater: Scena's Journey

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Summary

This paper presents a comprehensive framework for the digital transformation of the performing arts, using the SCENA project as a case study. SCENA, Italy's first digital platform for theater production, demonstrates how technologies like virtual scenography and centralized asset management can address challenges like fragmented resource management and financial instability. We build on this with an overarching framework that integrates key pillars: Cultural Digital Ecosystem, Capacity Building, Sustainability KPIs, and Long-Term Strategic Vision. This model fosters collaboration, optimizes resources, and promotes sustainable growth, offering valuable insights for theaters, policymakers, and cultural institutions navigating digital innovation.

Keywords: Digital transformation, theaters, performing arts, sustainability

JEL code: D22; L22; L30; M15; M20; O32; Z11

1. Introduction

The Italian performing arts sector faces a digital divide, with cinemas embracing innovation while theaters lag behind. Cinemas have embraced digital innovation to enhance the audience experience and remain competitive, incorporating new technologies and diversifying their offerings (Soledad, 2023; Brown, 2023). In contrast, as of 2024, only 43% of Italian theaters have invested in digital solutions, putting their creative potential and long-term sustainability at risk (Osservatorio innovazione digitale per la cultura, 2024). Without integrating modern technologies, theaters risk being confinedto outdated production and management models, limiting their ability to innovate and remain relevant in a rapidly evolving cultural landscape (Addis and Rurale, 2021). This stagnation threatens creativity and originality, especially in contemporary theater, leading to a loss of the

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"spark" that once made the sector unique and indispensable (Goeler, 2015). Technologies like ER, AR, and VR offer opportunities to enhance efficiency and reduce costs, but insufficient funding, outdated infrastructure, and a lack of digital skills persist as major obstacles, especially for smaller theaters (Rurale *et al*., 2020).

The SCENA project, launched in 2024, addresses these challenges by providing a multi-service platform to support digital transformation in Italian theaters. SCENA integrates virtual scenography, 3D visualization, and digital warehouse management, offering solutions that drive improvements across the three pillars of sustainability: economic, social, and environmental.
Economically, it reduces production costs and fosters new revenue streams; socially, it promotes collaboration and knowledge sharing; environmentally, it encourages the reuse of sets and equipment within a circular economy model.

Learning from the SCENA case, we develop an overall framework based on four key pillars: Cultural Digital Ecosystem and Resource Sharing, Capacity Building and Digital Competencies, Sustainability KPIs, and a Long-Term Strategic Vision. This framework aims to foster sustainable growth, optimize resource use, and modernize the management of theater productions in Italy. By adopting this structured approach, theaters can bridge the digital divide, enhance their competitiveness, and establish themselves as key players in the modern cultural landscape. Our strategic framework offers a path for theaters to overcome resource fragmentation and align with long-term growth strategies.

2. SCENA: the First Innovative Digital Collaborative Platform for Theaters

SCENA is the first collaborative platform for theater production that seamlessly integrates production efficiency with sustainability by leveraging the latest and most advanced technologies. Built on a multi-sided model, SCENA fosters interaction between various user groups, including theater professionals, material suppliers, and audiences, all within a single ecosystem. This structure generates value through indirect network effects – as the number of users in one group (e.g.,suppliers) grows, the overall value for other user groups (such as theater professionals) increases, creating synergies and enhancing efficiency across the board (Rysman, 2009).

The platform is designed to support theater managers in navigating the challenges posed by digital transformation. Specifically, it serves as an enabling tool for cultural and creative operators to integrate sustainability into their business models more effectively. Through SCENA, theater managers can harness digitalization as a powerful enabler of sustainability strategies, producing transformative impacts across economic, environmental, and social dimensions. SCENA is built around four key pillars:

a. Asset and Production Management: This pillar establishes a centralized digital system for

managing theater assets and production processes. It optimizes resource allocation, ensures compliance with regulations, and supports administrative functions such as document management, ultimately streamlining operations.

b. E-commerce: SCENA facilitates the buying, renting, and reuse of stage materials, props, andcostumes via a dedicated platform. This promotes resource efficiency and provides users witha tailored and easy to use application experience.
c. Community: This pillar fosters collaboration and interaction among users, creating a dynamicnetwork of professionals in the theater sector. It encourages knowledge-sharing and partnership opportunities, strengthening the overall ecosystem.
d. Virtual Spaces: SCENA offers tools for stage virtualization, allowing users to design and visualize scenes in a 3D environment. This feature enables efficient management of scenic assets, helping users simulate stage setups, streamline production phases and reduce costs for theaters' spaces utilization.

By leveraging digital platforms for management, performance, and community-building, SCENA enables theaters to reduce costs, improve operational efficiency, improve their business, and reach a broader audience. This positions them as key players in the modern cultural landscape while aligning with sustainability goals. However, achieving these benefits requires the development of a global and innovative framework for digital transformation in the theater industry.

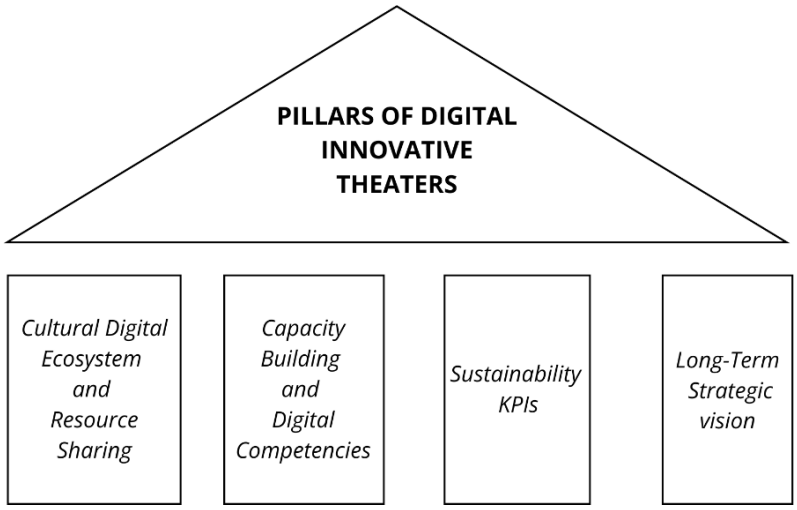
3. A Framework for Digital Transformation in the Theatre Industry

The digital transformation of the theater sector faces four major challenges that risk stifling growth, creativity, and long-term sustainability. First, the lack of strategic vision in many Italian theaters results in a fragmented approach to innovation and digital adoption, making it difficult for theaters to adapt to the evolving cultural landscape. Second, weak digital competences among theater staff limitthe integration of new technologies that could enhance both artistic creativity and operational efficiency, leaving many theaters unable to fully capitalize on the opportunities offered by digital tools. Third, limited performance indicators (KPIs) that do not account for sustainability impede theaters from aligning with broader environmental and societal goals. Without embedding sustainability into their operational models, theaters risk falling behind in the pursuit of modern cultural practices. Finally, a short-term orientation, with a focus on immediate box-office revenue, prevents theaters from investing in long-term strategies that could ensure their resilience andsustainable growth.

To overcome these challenges, we propose a framework for digital transformation built on four key pillars: Cultural Digital Ecosystem and Resource Sharing, Capacity Building and Digital Competencies, Sustainability KPIs Dashboard, and a Long-Term Strategic Vision. This framework, depicted in Figure 1, aims to guide theaters in embracing digital innovation and sustainability, ensuring their

competitiveness and adaptability in the contemporary cultural environment.

Figure 1. A framework for designing and implementing digital transformation projects in the theater industry



2.1. Cultural Digital Ecosystem and Resource Sharing

In the Italian cultural sector, a major challenge is the lack of a comprehensive strategic vision, and the performing arts are no exception (Addis and Rurale, 2021). The unique nature of theatrical performances, combining artistic creativity with temporal constraints, positions theaters outside traditional bureaucratic models. Theaters operate in dynamic, unstable environments that require flexibility and self-organization, which contrasts with the rigidity found in other cultural sectors (Graham, 1991). This project-based nature, where each production is treated as a distinct endeavor (Goodman and Goodman, 1976), makes it difficult for theaters to implement long-term strategies or establish sustainable business models. Financial instability further exacerbates this issue, as theaters struggle to cover operational costs through ticket sales alone, leaving them in a perpetual financial crisis (Baumol and Bowen, 1966).

A solution to these systemic challenges lies in the creation of a digital cultural ecosystem, an interconnected network of organizations and stakeholders that leverages digital technologies. These ecosystems break down traditional silos, fostering collaboration across institutions and industries, and creating value through stakeholder interactions rather than isolated efforts (Gyrd-Jones and Kornum, 2013; Weill and Woerner, 2015). By adopting technologies such as digital asset management, virtual scenography, and 3D visualization, theaters can streamline operations, improve accessibility, and stimulate innovation. To succeed, theaters must integrate these technologies into their strategies, optimizing resource management, enhancing collaboration, and planning productions more effectively.

Mastering digital ecosystems is essential for ensuring the long-term sustainability and competitiveness of cultural institutions in a digital age.

2.2. Capacity Building and Digital Competencies

In the Italian performing arts sector, the lack of personnel with adequate digital skills remains a critical issue, hindering innovation and operational efficiency in theaters. This gap is particularly evident in the integration of digital technologies, which could enhance both creative and managerialprocesses. Most research focuses on artistic aspects, overlooking the need for technical proficiency to practically apply these tools. As a result, theaters struggle to create a digital aesthetic identity, a concept essential to modernizing performances and attracting tech-savvy audiences (Webb and Layton, 2023).

Training and capacity building must be prioritized, integrating digital competence into professional development. Theaters need to foster a culture of continuous learning, where both currentand future creators can develop the skills required to practice digital performance effectively. Furthermore, the lack of such skills leads many theaters to maintain outdated practices, hindering their ability to innovate and attract modern audiences accustomed to digital experiences.

A sustainable solution lies in a network model where theaters collaborate to share resources and expertise. Creating a community of skilled professionals with digital expertise allows theaters to gradually internalize these skills, fostering innovation and long-term operational improvements.

Additionally, by forming strategic partnerships, theaters can address digital challenges and build a foundation for continued modernization in the sector.

2.3. Sustainability KPIs

In the performing arts sector, the use of limited Key Performance Indicators (KPIs) – primarily focused on economic metrics like ticket sales – has hindered a comprehensive evaluation of sustainability. By the 1990s, professionals began advocating for the inclusion of non-financial KPIs, considering their importance in long-term strategy (Turbide and Laurin, 2009). Today, integrating environmental and social KPIs is crucial, as sustainable practices not only address climate challenges but also enhance operational efficiency (Molina-Castillo *et al*., 2021). Despite this, many theater institutions still struggle to implement KPIs that consider their environmental and social impact.

Adopting KPIs for sustainability can generate added value not only for the environment but also for businesses (Young *et al*., 2021). In the theatrical context, the challenge of adopting sustainable KPIs is particularly complex. For example, some experiences, such as the "Dark Water" production by University Theatre, which reduced the use of new scenic materials and reused recycled sets, demonstrate that sustainable practices can be successfully integrated into theater productions (Sweigart-Gallagher, 2018).

In response to these challenges, an innovative approach that promotes sustainability in the theater sector can be highly effective. Facilitating the reuse of scenic assets and the adoption of ecological practices helps to reduce waste and minimize the overall environmental impact. Additionally, through advanced technologies, theaters can monitor and optimize resource usage in real time, integrating sustainable KPIs into their operations. This approach allows for the precise measurement of the environmental impact of productions, aligning with the objectives of the European Green Deal. By improving operational efficiency and making sustainability a central pillar of the production process, this approach provides a concrete response to the environmental and social challenges facing the performing arts sector.

2.4. Long-Term Strategic Vision

Italian theaters, particularly small and medium-sized ones, often prioritize short-term survival due to financial constraints, neglecting long-term strategic planning. Many theaters operate year-to-year, driven by immediate cash flow needs, limiting their ability to invest in digital technologies and innovation. This short-term approach, worsened by reliance on public funding with a focus on immediate results, traps theaters in a cycle that fragments resources and hinders modernization efforts (Canziani, 2023; Rosenberg and Taylor, 2003).

The COVID-19 pandemic further accentuated theaters' short-term focus, with many, such as theTeatro alla Scala in Milan and the Maggio Fiorentino, viewing digital as a temporary measure ratherthan a long-term strategy, relying on a swift return to normalcy (Bellini and Raglianti, 2023). Many institutions did not fully integrate these innovations into their business models, reflecting a lack of strategic vision to harness the potential of digital solutions beyond the crisis (Hawthorne, 2023).

Italian theatrical productions, as in many other countries, typically follow a seasonal model, leading to the overproduction of new shows and inefficient asset management. Digitizing the production process – from asset management to coordination – offers a long-term opportunity to streamline resources and boost operational efficiency. However, the absence of a long-term vision limits the adoption of platforms that could facilitate inventory management and innovative solutions like virtualization and e-commerce.

To tackle these challenges, embracing digital solutions is essential. Developing a digital creative ecosystem would centralize resource management, promote sustainability, and foster collaboration, helping theaters overcome fragmentation and align with long-term strategies. By integrating advanced technologies, theaters can improve resource efficiency, optimize workflows, and create a more cohesive and sustainable cultural sector, positioning themselves for future growth. Furthermore, digitalization is set to transform and renew cultural organizations, while simultaneously increasing their capacity to adapt and absorb shocks, making them more flexible in the face of future challenges

(Bacchini *et al*., 2023).

4. Conclusion

Despite the prospective social, environmental and economic benefits of digitalization, the Italian theater sector faces significant delays in adopting digital technologies. This is partly due to financial constraints and to the consequent lack of a long-term strategic vision that ultimately turns each performance into a unique, isolated project. The purpose of the present paper is to show how digital cultural ecosystems allow to create collaborative spaces that foster resource sharing, encourage synergy and knowledge exchange, and drive innovation. Through the development of our overall framework based on the SCENA case, we disclose how digital transformation can lead to greater efficiency, sustainability, and competitive advantage, enabling theaters to achieve results that would be unattainable individually.

Indeed, tools like centralized asset management and 3D virtual visualization can optimize production processes, reduce costs, and elevate production quality. However, cutting-edge technologies must be paired with innovative management models that integrate sustainability and digitalization – both crucial for the future of theaters. By adopting sustainable KPIs, theaters can track resource consumption in real time, reduce waste, and promote circular management practices. This combination of operational efficiency and sustainability is key to integrating digital solutions that not only solve current challenges but also unlock new opportunities for growth and innovation in the performing arts. Ultimately, building a long-term digital strategy provides a solid foundation for the future of Italian theaters in a strategic vision.

We believe that the SCENA experience might serve not only as a model for digital transformation but also as a catalyst for lasting change, inspiring theaters to embrace technology as a driving force for sustainable, integrated growth.

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