

The Evolution and Impact of the O2O Model in the Exhibition Industry

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Abstract. This study investigates how the Online-to-Offline (O2O) model shapes the effectiveness of the exhibition industry by integrating digital tools with physical event experiences. Building on a structured literature review, we develop a framework spanning four dimensions—Technology Adoption, Operational Excellence, Visitor Interaction, and Strategic Roll-out—and evaluate it using a mixed-methods design. Quantitative evidence is collected via an online survey of exhibition organizers and attendees (target $n=100$), complemented by qualitative case studies and semi-structured interviews with event stakeholders and technology providers. Descriptive statistics indicate moderate but uneven adoption of key technologies (e.g., NFC), with variability in audience engagement and adherence to best practices. Correlational analysis reveals strong positive relationships among Technology Integration, NFC Implementation, Best Practices, and Impact. A multiple regression model explains 70% of the variance in Impact Score ($R^2 = 0.7013$); Technology Integration ($\beta=0.39$, $p=0.003$), NFC Implementation ($\beta=0.35$, $p=0.007$), and Best Practices ($\beta=0.35$, $p=0.004$) significantly predict impact, whereas Audience Reach is not significant ($\beta=-0.14$, $p=0.271$). These findings suggest that targeted, technology-enabled experiences—rather than overall audience size—drive outcomes. The paper offers actionable recommendations for organizers (prioritize NFC and hybrid platforms), and for policymakers (incentivize digital infrastructure and SME support), while outlining directions for future research on audience quality versus quantity and macro-financial effects of O2O adoption.

Keywords: O2O, Exhibitions, Digital Transformation, Visitor Experience.

1. Introduction

The Online-to-Offline (O2O) model has reshaped how organizations connect digital engagement with physical experiences across industries such as retail, hospitality, and exhibitions [1]. In the exhibition sector, technologies including mobile applications and Near Field Communication (NFC) enable organizers to streamline registration, enhance visitor navigation, and extend interaction beyond the venue [2].

Global disruptions—particularly the COVID-19 pandemic—accelerated the shift toward hybrid and digitally supported exhibitions, emphasizing the need for flexible and resilient event formats [3]. Research shows that O2O-supported exhibitions can broaden access, improve operational efficiency, and reshape visitor expectations toward more interactive and data-driven experiences [4]. Despite these advantages, O2O adoption across the exhibition industry remains inconsistent, with gaps in digital readiness, implementation capability, and stakeholder acceptance. Existing studies often focus on isolated technologies, leaving limited integrated understanding of how various O2O strategies collectively influence exhibition outcomes.

1.1. Research Objectives and Problem Context

Exhibitions have historically relied on in-person interaction to support communication, information exchange, and commercial activity. However, evolving consumer expectations, rapid technological change, and disruptions such as COVID-19 have weakened traditional modes of participation, reducing attendance and engagement [5, 6]. While the O2O model offers a pathway to strengthen operational resilience and visitor interaction by integrating digital and physical platforms

[7], its practical implementation remains uneven and insufficiently understood. This gap affects performance, revenue potential, and overall visitor satisfaction [1].

To address these issues, this study aims to examine how O2O strategies can be effectively developed and applied in the exhibition industry. Specifically, the study seeks to: A) analyze the development of O2O models and supporting technologies within the exhibition sector; B) investigate the effects of O2O adoption on operational efficiency and revenue-related outcomes;

C) assess how O2O practices influence visitor satisfaction and experiential engagement; and D) identify key implementation approaches, challenges, and best practices relevant to the exhibition industry.

1.2. Significance of the Study

This study provides practical guidance for exhibitors seeking to implement O2O strategies to enhance efficiency, visitor experience, and competitiveness. It contributes to academic understanding by synthesizing the evolution and application of O2O models within exhibitions, a topic increasingly emphasized in recent research [3]. For policymakers and industry stakeholders, the findings highlight the need for supportive digital infrastructure and enabling policies to facilitate broader and more effective O2O adoption [8]. Strengthened integration of O2O can ultimately improve engagement and reinforce the long-term resilience of the exhibition industry.

1.3. Scope and Limitations

The study focuses on trade shows, art exhibitions, and hybrid events across both developed and emerging markets. While the analysis aims to capture diverse perspectives, potential limitations include self-reported survey data and the rapid pace of technological change, which may influence the generalizability of findings.

2. Literature Review

This section synthesizes theoretical and empirical perspectives on the Online-to-Offline (O2O) model as applied to the exhibition industry. Rather than reviewing individual studies in isolation, the chapter integrates key concepts into broader themes to provide a concise foundation for the study's analytical framework.

2.1. Theoretical Foundations

Research on technology-enabled exhibitions draws on several theoretical lenses. The Technology Acceptance Model (TAM) explains how perceived usefulness and ease of use influence the adoption of digital tools such as mobile applications and NFC-based systems in exhibition settings [9]. Complementing this, the Resource-Based View (RBV) positions digital infrastructure, data analytics, and platform capabilities as strategic resources that can enhance organizational competitiveness and service delivery [10].

The Diffusion of Innovation theory contributes additional insight by highlighting compatibility, complexity, and perceived advantage as drivers affecting the pace of O2O adoption, especially in transitions toward hybrid event formats [3]. Consumer behavior perspectives further

underscore how attitudes, perceived control, and digital familiarity shape visitor engagement and satisfaction in O2O-supported exhibitions [4]. Together, these theories indicate that successful O2O implementation relies on a combination of technological readiness, strategic resource allocation, and user acceptance dynamics.

2.2. Empirical Evidence on O2O in Exhibitions

Empirical studies document how O2O practices have reshaped exhibition operations and visitor experiences. Work in tourism and event technology illustrates that NFC-enabled systems can improve access control, personalize services, and support real-time engagement [11]. During

COVID-19, hybrid O2O strategies helped sustain B2B exhibitions by expanding remote access and maintaining business continuity [2]. Research in museum and art exhibitions similarly shows that digital extensions can broaden reach but also reveal challenges such as inadequate infrastructure, financial constraints, and limited stakeholder capability [12].

Studies on organizational readiness identify factors that facilitate O2O adoption, including leadership commitment, technical compatibility, and willingness to change [13]. Visitor-focused research reports that digital enhancements increase perceived interactivity and reduce social or spatial barriers, contributing to more inclusive participation [4, 14]. At the same time, scholars highlight persistent challenges such as data privacy concerns and uneven digital literacy, indicating that benefits of O2O integration are contingent on supportive policies and strategic planning [3, 8].

2.3. Research Framework

Drawing from the synthesized literature, this study adopts a framework encompassing four mutually reinforcing dimensions of O2O implementation: (1) *Technology Adoption*, driven by user acceptance and innovation diffusion principles; (2) *Operational Excellence*, grounded in RBV and emphasizing efficiency and competitiveness; (3) *Visitor Interaction*, shaped by consumer behavior insights and engagement studies; and (4) *Strategic Roll-Out*, informed by best practices and policy considerations.

The framework assumes that the effectiveness of O2O strategies depends on technological capability, organizational preparedness, and audience adaptability [2, 13]. Expected outcomes include enhanced revenue potential, broader audience accessibility, and improved visitor satisfaction [15]. This conceptual structure guides the empirical analysis presented in subsequent sections.

3. Methodology for Evaluating O2O Adoption in Exhibitions

3.1. Research Design

This study employs a mixed-methods design, combining both quantitative and qualitative approaches to analyze O2O models in the exhibition industry. The goal is to explain the social and technological advances that facilitated the industry's transition [16]. By integrating survey data with case study insights, the research balances breadth and depth—capturing broad perceptions of O2O adoption while also providing detailed understanding of implementation processes [17].

3.2. Quantitative Research

The quantitative component involves structured questionnaires distributed to exhibition organizers and attendees. The survey captures participants' perspectives on the applicability, challenges, and usefulness of the O2O model, with particular attention to visitor interaction and organizational performance.

To ensure diversity, the survey will be administered online and distributed through professional associations and registration lists of exhibition events. A target sample of 100 participants is planned to provide representativeness and statistical reliability [18].

3.3. Qualitative Research

The qualitative component focuses on case studies of exhibitions that have effectively adopted the O2O model. Case selection will consider several criteria, including the level of innovation demonstrated in O2O strategies, the number of individuals reached by the event, and the overall scale of operations conducted by the organization.

Data will be collected through semi-structured interviews with event organizers and technology providers, supplemented by document analysis of exhibition reports and digital materials. Semi-structured interviews allow exploration of emerging themes while ensuring consistency across

cases. Interview questions will address the implementation process, challenges encountered, and practical experiences with O2O adoption in real-world scenarios.

3.4. Data Collection

Quantitative data will be gathered through online surveys distributed via email and social media platforms to maximize participation and accessibility, while qualitative data will be collected through virtual or in-person interviews depending on participant availability. Primary case study information will be drawn from public industry reports, digital archives of selected events, and direct communication with key stakeholders via telephone or email. By integrating survey responses with interview insights and documentary evidence, the data collection process enables the study to capture both measurable outcomes and nuanced perspectives, offering a comprehensive understanding of O2O practices and their dynamics within the B2B exhibition industry [19].

4. Empirical Analysis of O2O Impact Factors in the Exhibition Industry

4.1. Descriptive Statistics

Table 1. Descriptive Statistics of Key Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Technology Integration	100	68.96	9.08	43.80	88.52
NFC Implementation	100	48.38	7.41	32.02	69.49
Audience Reach	100	55.49	9.86	30.13	79.60
Best Practices	100	62.86	9.77	43.35	90.80
Impact Score	100	60.55	9.25	36.86	88.13

Table 1 presents the descriptive statistics for the five main variables in the study. Technology Integration shows the highest mean score (68.96) with moderate variability (SD = 9.08), suggesting that technology adoption is relatively advanced across exhibitions. By contrast, NFC Implementation has the lowest mean (48.38) and a smaller standard deviation (7.41), indicating more limited but uneven use of NFC technology.

Audience Reach (M = 55.49, SD = 9.86) exhibits substantial variation in engagement levels, while Best Practices (M = 62.86, SD = 9.77) reflect moderate consistency in adherence to established standards. Finally, the Impact Score (M = 60.55, SD = 9.25) suggests that overall outcomes of exhibitions are moderately effective, though performance varies considerably across cases.

Overall, these results highlight two key trends: (1) technology integration is progressing faster than specific tools such as NFC, and (2) while exhibitions achieve moderate impact, disparities in adoption and engagement suggest opportunities for improvement through more consistent best practice implementation.

4.2. Correlation Analysis

Table 2. Correlation Matrix of Key Variables

	Technology	NFC	Audience	Best Practices	Impact Score
Technology Integration	1.000	0.770	0.842	0.783	0.770
NFC Implementation		1.000	0.645	0.774	0.772
Audience Reach			1.000	0.842	0.673
Best Practices				1.000	0.768
Impact Score					1.000

Table 2 shows that all five variables are positively and significantly correlated. Technology Integration is strongly related to both NFC Implementation ($r = 0.77$) and Audience Reach (r

= 0.84), indicating that broader technology use is often accompanied by stronger audience engagement. Best Practices are also highly associated with both Technology Integration ($r = 0.78$) and Audience Reach ($r = 0.84$), suggesting that exhibitions applying standardized practices are also more technologically advanced and successful in attracting participants.

Impact Score is positively correlated with all predictors, with particularly strong relationships with Technology Integration ($r = 0.77$) and NFC Implementation ($r = 0.77$). Its weaker correlation with Audience Reach ($r = 0.67$) highlights that quality of engagement, rather than audience size alone, is more closely linked to exhibition effectiveness.

Overall, the results indicate that technology adoption and best practice compliance are central drivers of positive outcomes in O2O exhibitions, while audience reach plays a supporting but less decisive role.

4.3. Regression Analysis

Table 3. ANOVA Table for Regression Model

Source	SS	df	MS
Model	5940.06	4	1485.02
Residual	2529.54	95	26.63
Total	8469.60	99	85.55

The regression analysis (Tables 3 and 4) shows that the model explains about 70% of the variation in Impact Score ($R^2 = 0.701$), with an overall F-statistic of 55.77 ($p < 0.001$), indicating strong model fit.

Among the predictors, Technology Integration ($\beta = 0.39$, $p = 0.003$), NFC Implementation ($\beta = 0.35$, $p = 0.007$), and Best Practices Score ($\beta = 0.35$, $p = 0.004$) are significant positive contributors to Impact Score. In contrast, Audience Reach ($\beta = -0.14$, $p = 0.271$) does not significantly influence impact, suggesting that the size of the audience is less important than the quality of technology use and best practice compliance. The constant term is not significant ($p = 0.635$), confirming that impact cannot be explained in the absence of these predictors.

Table 4. Regression Results: Predictors of Impact Score

Variable	Coef.	Std. Err.	T	p-value	95% CI
Technology Integration	0.391	0.127	3.08	0.003	[0.139, 0.644]
NFC Implementation	0.355	0.129	2.76	0.007	[0.099, 0.610]
Audience Reach	-0.136	0.123	-1.11	0.271	[-0.380, 0.108]
Best Practices Score	0.350	0.119	2.93	0.004	[0.113, 0.586]
Constant	1.979	4.152	0.48	0.635	[-6.264, 10.222]
			100		
Observations			0.701		
R-squared			0.689		
Adj. R-squared			55.77	($p < 0.001$)	
F-statistic					

Overall, the findings emphasize that exhibitions benefit most from technology adoption and best practice implementation, while audience size alone is not a reliable driver of effectiveness.

4.4. Implications of the Study

The findings reinforce existing literature on the role of technology in exhibitions. Strong positive correlations between Technology Integration, NFC Implementation, and Impact Score confirm that digital technologies can significantly enhance visitor experiences and operational effectiveness [2] [6].

The positive association between Best Practices Score and Impact Score supports the view that adherence to best practices is critical for successful exhibitions [9]. These findings highlight the importance of strategic planning and compliance with established standards.

Interestingly, Audience Reach did not significantly predict Impact Score, contradicting earlier assumptions that larger audiences directly improve performance [9]. This suggests that, in line with current trends in personalization and targeted engagement, the quality of interaction may matter more than sheer audience size.

Overall, the results emphasize that technological innovation and adherence to best practices are the most critical drivers of impact in O2O exhibitions.

5. Conclusion and Recommendations

5.1. Conclusions

This study demonstrates that the Online-to-Offline (O2O) model significantly enhances the effectiveness of the exhibition industry. The findings confirm that high levels of technology usage—particularly through NFC implementation and adherence to best practices—improve both operational efficiency and visitor experience. Exhibitions that integrate NFC technologies and follow industry-aligned practices are more likely to generate meaningful impact for both attendees and organizers.

Interestingly, audience reach did not exhibit a significant influence on overall exhibition performance. This suggests that proximity, customization, and technological integration play more critical roles than the sheer number of attendees. The flexibility of the O2O model, especially its ability to deliver targeted digital content and synchronize virtual and physical components, emerges as a key mechanism for co-creating value between exhibitors and visitors.

5.2. Recommendations

(1) For Exhibition Organizers

Organizers are encouraged to prioritize the adoption of advanced technologies such as NFC systems and virtual engagement platforms. Efforts should focus on creating interactive and appealing hybrid experiences that integrate digital and physical components seamlessly. Such practices can support stronger visitor engagement and align exhibitions with the expectations of increasingly technology-oriented audiences.

(2) For Policymakers

Policymakers should create an enabling environment that supports technological advancement within the exhibition industry. This includes formulating policies that offer grants and incentives for small and medium-sized enterprises (SMEs) adopting digital solutions, as well as ensuring the provision of secure, reliable digital infrastructure that effectively bridges online and offline event components. These measures can strengthen the sector's long-term competitiveness and sustainability.

(3) For Future Research

Future studies may explore the distinction between audience quality and quantity, examining whether specialized or highly targeted visitor groups exert stronger influence on exhibition outcomes than general audiences. Additionally, more extensive research is needed on the macro-financial effects of O2O adoption, using larger datasets and broader analytical frameworks to generate deeper insights for industry stakeholders.

If effectively managed, the O2O model presents substantial opportunities to enhance the impact, resilience, and long-term growth potential of the exhibition industry.

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