



Towards Digital Transformation Technologies Application in the MICE Industry in Egypt

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Abstract

Digital transformation (DT) has revolutionized the way events are managed from corporate conferences to music festivals and weddings, etc. Despite the huge advancements in DT, the research on DT in the events industry is extremely limited – a gap that is partially filled with this paper. Specifically, this paper aims at exploring the extent to which DT technologies are used in the MICE industry in Egypt, besides, identifying the most commonly used DT technologies in MICE events management in Egypt. Moreover, discussing the available opportunities and the main barriers to applying DT in MICE industry. To achieve this, structured interviews were a key component of this study's quantitative approach. A sample of 26 responses from managers and event organizers in the Egyptian tour operators (TOs), event management companies (EMCs), and exhibition and conference centers (ECCs) in Cairo were targeted. The responses were analyzed using descriptive statistics, one-way ANOVA, and Spearman's Rho correlation analysis with the support of SPSS 25. The findings revealed that despite the awareness of DT technologies, they are still not widely utilized in MICE events management in Egypt. Besides, the primary types of DT technological applications being used in the MICE industry in Egypt are mobile applications and social media, followed by the Internet of Things and big data on a smaller scale. The research implemented a comprehensive approach that might aid the adoption of DT technologies in the MICE industry, involving training, infrastructure development, awareness building, and government support.

1. Introduction

The event industry has been one of the fastest-evolving industries in the world. Different destinations in many countries are realizing the importance of the event industry in attracting visitors and are attempting to establish new events to capitalize on this vibrant industry (Cobanoglu, et al., 2021). Events in the present can be compared to the grand exhibitions of the 19th century, where countries would highlight their most recent technological developments to the global community (Topsakal et al., 2022). Consequently, there is a tacit expectation that events will showcase the newest advancements in digital technology. Moreover, events are intricate supply chains, and a digitally mature events industry may give businesses a competitive edge. For instance, by enabling lightning-fast communication with outside partners, the capacity to digitally access data can enhance conferences and exhibitions (Ryan et al., 2020). Furthermore, digital technology can improve access and sociability, refine the personalization of events, and create better experiences for fans, spectators, delegates, and organizers, among other ways to enhance engagement with events (Topsakal et al., 2022).

MICE events have a prominent position in the event industry (ICCA, 2018) and are one of its fastest-growing sectors. The term MICE refers to meetings, incentives, conventions and exhibitions, it is a significant type of tourism in which large groups are brought together for particular purposes. The global business travel market size reached US\$ 1.0 Trillion in 2022. Looking forward, the publisher expects the market to reach US\$ 1.5 Trillion by 2028, exhibiting a growth rate (CAGR) of 7.6% during 2023-2028 (Business Travel Market Report, 2023). According to the African perspectives on the MICE industry report 2021, Egypt was one of the few North African nations to specifically emphasize improving its representation at international travel fairs to fully utilize its promotional potential (Jacobsen, 2021).

MICE events are in the midst of rapid social and technological change. With a growing variety of technological means, the industry is fast-paced and increasingly delivered to a discerning consumer market while finding ways to connect with consumers through technology (Topsakal et al., 2022). The triple revolution of increased smartphone ownership, social media and faster Internet speeds continues to create a more networked and connected experience for people and organizations (Ryan et al., 2020). Furthermore, there are sprinklings of cutting-edge artificial intelligence (AI) applications (like event bots) throughout the sector. However, the rate at which AI develops will determine how things turn out in the future. Scholars predict that event planners will transition from using specialized event apps to sending content via messaging platforms using personal event bots, as they envision highly customized events based on user preferences (Celuch, 2021). Organizations are woven together by digital technology (Li et al., 2018). It plays a bigger role in how they interact with their customers. Digital technology is still omnipresent at celebrations and events all over the world, despite some opposition (VanWinkle et al., 2018).

MICE industry is undergoing a remarkable DT that will usher in a new era of efficiency, innovation, and enhanced attendee experiences. Moreover, the landscape

of the industry is changing due to digital technologies. Accepting these technological innovations helps event planners as well as provide guests with longer-lasting and more interesting experiences. To maintain their exceptional event delivery skills and leave a lasting impression, MICE industry professionals must stay up to date on digital innovation (Davidson, 2018). Thus, the knowledge gap between the two concepts still needs a lot of work. This demonstrates the significance of the current study, which contributes towards filling that gap by elaborating the current level of DT technology adoption in MICE events and exploring the main DT technologies that are used in MICE events particularly in Egypt. The study seeks to understand the current level of adopting DT in the event industry in Egypt and explore the critical technologies that affect the events industry and help ensure events success. Consequently, research questions are summarized as follows:

1. To what extent are DT technologies utilized in MICE events in Egypt?
2. What are the most commonly used DT technologies in MICE events management in Egypt?
3. What are the opportunities of applying DT technologies in MICE events in Egypt?
4. What are the disadvantages and the main barriers to applying DT technologies in MICE events in Egypt?
5. Is there any relation between the events' type and the used DT technologies?

2. Literature Review

2.1. Digital Transformation Definitions and Technologies

According to Ryan et al. (2020) and Li et al. (2018), the term "digital transformation" refers to the transformation brought about by the presence of digital technologies. These fundamental changes have been made to business operations, processes, operational routines, companies' capabilities, and strategies. As a result of the vast number of changes in people, technology, and processes in the digital era, the way organizations manage performance has altered (Kohtamäki et al., 2020).

Digitalization is the application of digital technology to modify and enhance an organization. This improvement may be seen as more effective and less expensive than earlier or conventional methods (Denicolai et al., 2021). Digital technologies affect many aspects of society and the economy because they facilitate greater network connectivity. According to Topsakal et al. (2022), the definition of digitalization is the use of digital technologies and data to increase revenue transform business models, and create a digital information environment for digital enterprises.

According to Wessel et al. (2020), digital transformation is the process of attempting to improve an entity by utilizing a variety of information, computation, communications, and networking technologies to make significant changes to its features. Digital transformation quickly increases a firm's power and efficiency by combining operations and business activities, structures, and processes in digital form (Park and Mithas, 2020). Utilizing digital technologies like cloud computing and the enormous amounts of data and analytics they generate, digital transformation is a new approach to conducting business (Hadjielias et al., 2022). The COVID-19 pandemic has had a significant impact on the entire industry, leading to a rise in digitalization in recent years (Borges-Tiago et al., 2021). People searched for an alternative means of

keeping in touch with friends, family, and coworkers while still being able to work, study, and live, since physical separation was required (Ryan et al., 2020).

Fernandez-Rovira et al. (2021) state that the events industry is utilizing digital transformation technologies like social media, cloud computing, artificial intelligence, big data, augmented reality, virtual reality, and the Internet of Things. This study examines the major technologies which are used and have value in the events industry, represented as follows.

2.1.1 Artificial Intelligence (AI): is the technology that allows for on-demand personalization and customization of services, as well as easier and more comfortable travel (Kindzule-Millere and Zeverte-Rivza, 2022). As artificial intelligence (AI) and robotics technologies advance, an increasing number of robots with various technical functions as well as hazardous, unclean, and repetitive jobs are being developed for use in the tourism and hospitality industries. Given the COVID-19 situation, robots can be a helpful tool for physically separating hosts and guests (Seyitoglu and Ivaov, 2021). When combined with other technologies, artificial intelligence (AI) is defined as intelligent automation that advances the idea of smart tourism (Tussyadiah, 2020).

2.1.2 Big Data Analytics: Using big data is one of the biggest challenges facing technological innovation and digitalization in recent years (Fernandez-Rovira et al., 2021). Large amounts of data are generated by businesses and consumers in the digital age (OECD, 2020). Using this data is seen as a mean of increasing customer satisfaction and loyalty because it comes from the customers themselves and can be used to predict demand, customer behavior, purchase preferences, and offer opportunities of personalization. Thus, it is clear that this is a significant marketing consideration (Fernandez-Rovira et al., 2021; Fraccastoro et al., 2021). When used properly, information from big data studies can give businesses the chance to create new entrepreneurial models and boost output (Kindzule-Millere and Zeverte-Rivza, 2022).

2.1.3 Internet of Things (IoT): refers to the automation, data, and sensor interoperability that provides real-time data and information. It is employed in the management and promotion of tourism because it can enhance the experience of travelers. IoT boosts operational and resource efficiency while lowering environmental impact, which enables greater urban efficiency through a data-rich tourism industry and support for smart tourism (Kindzule-Millere and Zeverte-Rivza, 2022). Most IoT applications involve other technologies.

2.1.4 Mobile Technology and Cloud Computing: Wi-fi and international mobile plans have become more widely available due to cloud computing, and mobile devices are being used for travel-related purposes such as online booking, mobile payments, and real-time destination information access. Conversely, cloud computing allows businesses to manage their operations from any location in the globe. An internet connection is all that is required (OECD, 2020). With their various technologies, mobile phones serve as various travel agencies, tour guides, tour operators, travel maps, and restaurant locators of the highest caliber. Trip Advisor reports that 45% of users use their smartphone during the booking process (Raga, 2020), and mobile travel applications are regarded as a developing market.

2.1.5 Virtual Reality (VR) and Augmented Reality (AR): are digital environments with interactive experiences; however, when comparing the two, VR produces a more immersive interaction. AR systems allow users to view virtual objects in the real world. AR is the addition of digital information to the real environment. This allows travelers to experience entirely new and imaginary realities, as well as historical, educational, and adventurous experiences (Kindzule-Millere and Zeverte-Rivza, 2022). It might even improve their experience if it contains text and graphics (Chamboko-Mpotaringa and Tichaawa, 2021). Travelers can virtually immerse, orient, and interact using various senses with virtual reality (VR) (Wei et al., 2019). Travelers can now look for new and specific locations and destinations thanks to the digital environment.

2.1.6 Social Media (SM): is a vital information and engagement tool that is used to build relationships with travelers before, during, and after travel as well as to raise brand awareness for businesses, destinations, and attractions (Hysa et al., 2021). When evaluating the cycle of technological development, it is highlighted that the most significant changes occurred immediately following Web 2.0. This is because the capacity to share content during these decades has caused a paradigm shift in communication, with people frequently basing their travel decisions on information they have seen on social media. These days, having social connections is essential for people (Chamboko-Mpotaringa and Tichaawa, 2021). With SM's increasing influence, more and more significant marketing strategies have been created for particular target audiences, providing pertinent content to improve audience accessibility (Borges-Tiago et al., 2021).

2.2 Opportunities and Barriers to Digital Transformation

Digital transformation is the integration of digital technology into all areas of a business resulting in fundamental changes to how businesses operate and deliver value. It helps streamline operations, increase efficiency, gain deeper insights into customers’ needs and behavior, foster innovation, and drive business growth (Raga, 2020; WTO, 2021). Digital transformation is no longer a choice; it is a necessity for organizations to remain competitive. While digital transformation can bring many benefits to organizations, it also poses a handful of challenges (Hadjielias et al., 2022). Opportunities and barriers to digital transformation in the events industry are presented in Table 1.

Table (1) Opportunities and Barriers of Digital Transformation

Opportunities/ Benefits	Challenges /Barriers
<ul style="list-style-type: none"> • Has the potential to lower expenses, save time and resources, and boost efficiency. • Broadens the audience, expands international reach, and can assist in breaking into new markets. • Stimulates innovation and creativity, raises the standard of service, and gives clients more individualized services. • Enhances decision-making, and facilitates quick and easy information exchange with stakeholders. • Boosts sales and online brand visibility builds customer loyalty and business reputation. • Retains competitiveness and achieves a long-term competitive advantage. 	<ul style="list-style-type: none"> • Difficulty to recognize the opportunities and take use of them. • Insufficient technical knowledge, ICT and digital skills, and training in new digital technology. • Lack of funds due to the high expenses, • Limited ICT and digital infrastructure, especially in rural regions. • Insufficient Experience in Oversee Digitization Projects.

Source: author’s compilation from several published literature (Raga, 2020, Hadjielias et al., 2022).

2.3 MICE Industry in Egypt

MICE (business) events (meetings, incentives, conventions, and exhibitions) are business-related events that involve travel. These types of events are essential to any destination's event portfolio. MICE events are estimated to be worth approximately \$30 billion per year worldwide. These events generate significant economic returns, thus some countries depend heavily on them (Davidson 2018).

The MICE Industry generates a lot of revenue for the national economy, as delegates spend a lot of time and money on MICE events as opposed to leisure tourists. It also brings significant profits to other related industries, such as transportation, accommodation and entertainment, advertising, and leisure. In addition, it creates many business opportunities for the tourism industry or other related sectors. Furthermore, a successful MICE event can enhance the image of the destination. (Abdelkafy and Hizah, 2016). MICE events typically attract a large number of participants; therefore, an exhibition can provide products and services to a large number of potential buyers. Conventions participation can also extend the relationship with other delegates in the same industry (Getz and Page, 2016). MICE tourism brings innovation, knowledge, and understanding to a country, as well as to service providers and event attendees. It also disseminates information and knowledge to countries in a broader and more rapid manner. Given the economic impact of MICE tourism on the host countries, many countries invest heavily in the development of their national services, equipment, infrastructure, and security measures to meet the international standards (Munjil, et al., 2014).

MICE Industry in Egypt is growing significantly. The country has invested heavily in all the tourism sectors, improving communication infrastructure, increasing transport connections, training professionals, and improving its promotion activities in global markets. As a result, MICE tourism has been one of the most positively impacted sectors, with tangible results. The best example of this was when Sharm el-Sheikh hosted COP27, the United Nations-sponsored Climate Change Conference, a global event that attracted thousands of visitors from all over the world, testing the organizational capacity of this tourist destination. The results were overwhelmingly positive in terms of security, hospitality, and services (Abdelmoaty and Fathy, 2023).

The Red Sea region is home to many of Egypt's best-positioned MICE destinations. Sharm el-Sheikh, located in the southern part of the Sinai Peninsula, is likely the most significant city in this respect. It is close to the international airport with flights from many Asian and European countries, and it has a large number of hotels with auditoriums and conference centers (Abdelmoaty and Fathy, 2023). Furthermore, Cairo, of course, is also a major player in Egypt's MICE tourism. With a population of approximately 10 million people, the capital serves as a reference point for the entire continent of Africa. As a result, it is often chosen to host high-profile events in this geopolitical region, including financial, political, sporting, cultural, and more. This is in addition to the new administrative capital, which is known as New Cairo (Abdelkafy and Hizah, 2016). The Mediterranean region and the Nile Delta are also important to consider, as they have a large population and are close to Europe. In this regard, Alexandria is the city with the most potential for hosting business events, in

industries ranging from agriculture to religion, due to the city's rich history of religious affiliations. Beyond these, there are also other cities that, despite having more restricted MICE infrastructure, can host important sector-specific events because of their importance in a specific activity. For example, Suez for logistics due to its strategic canal, Aswan for hydraulic engineering due to its iconic dam, and Luxor for archaeology due to its wealth of ancient monuments (Abdelkafy and Hizah, 2016).

Egypt has some entities that structure the MICE industry, represented as follows:

- Events Management Companies (EMCs) are companies whose main business is organizing events, by making all the arrangements and the necessary preparations for holding them (Davidson, 2018).
- Tour Operators (TOs) are companies that organize events alongside their main tourism business (Swarbrooke & Horner, 2012).
- Exhibition and Conventions Centers (ECCs).

2.4 Applicability of Digital Transformation Technologies in the MICE Industry

The MICE industry, with its numerous forms of special events, mega-events, exhibitions, and meetings undoubtedly plays a significant role in influencing and enhancing communities and economies around the world (Getz and Page, 2016). Indeed, technology advancements and the growth of the events industry go hand in hand (Ryan et al., 2020). According to Ryan et al. (2020), ICTs have recently been used mainly to support basic communication and aid in attendee engagement using social media, virtual reality (VR), or augmented reality technologies (AR) (Neuhofer et al., 2020), other academics have looked at how DT can improve event experiences (Van Winkle et al., 2018). Overall, DT plays a critical role in the organization of contemporary events and provides potential for improving event sustainability (Slater, 2020). Additionally, social media and mobile applications have been adopted to streamline event management and stimulate social gatherings (Wreford et al., 2019).

Prior to recently, the majority of business choices were based on information from a small number of conventional sources, including internal accounting records, production records, and market research reports (Strange and Zucchella, 2017). However, events can now offer their audience far more individualized and customized experiences thanks to the Internet of things, website analytics, Big Data, and social media data, events can provide their audience with much more personalized and tailored experiences. As event companies develop new and innovative ways to connect, the events themselves are absorbing aspects of I4.0 at every stage of the process; pushing the boundaries of event experiences far beyond the physical world (Ryan, 2020).

2.4.1 Pre-Event and during-Event Planning Technologies

Events and meetings do not just occur. The planning and coordination of these events, which guarantee client satisfaction and the accomplishment of event goals, can take months or even years. A meeting and event professional must think through and answer a number of questions when they start the pre-event planning process, including where the event will take place, how it will be unique, which suppliers will help ensure its successful execution, and what technology will be useful for event

planning (Causin and Scamacca, 2021). In this section, technologies used by MICE professionals in the pre-event planning phase are discussed.

2.4.1.1 Information Portals

An event professional may use an information portal in addition to the websites of meeting and events organizations, which can help with the planning of an event. A web information portal is a specifically created website that compiles data in a consistent manner from multiple online sources, such as emails, discussion boards, and search engines (Celuch, 2021). Information portals such as (www.eventmanagerblog.com or www.smartmeetings.com) can provide event management tips or compare the latest event technology through (www.eventtechbrief.com or www.capterra.com).

MICE professionals can create customized event experiences by using information portals and websites for meeting and event organizations. Attendee satisfaction and Return on Investment (ROI) both rise when the experience is personalized (Minnecci, 2019, Tatulli, 2019).

2.4.1.2 Virtual Site Selection and Research

The choice of a suitable location and venue is a crucial step early in the planning of meetings and events. MICE events planners have modified the site selection procedure over time in response to reduced lead times for planning, modifications to budgets, and advancements in technology (Celuch, 2021). MICE events planners frequently rely on virtual inspections because they lack the resources or the time to perform numerous on-site inspections. While technology can assist with some of the destination research, Causin and Scamacca (2021) suggests letting the MICE events' objectives guide the location. Once the purpose of the event has been determined, the professional can search online for properties and destinations that meet the goals (Event Leadership Institute, 2020).

2.4.1.3 Request for Proposal

A meeting professional may use a Request for Proposal (RFP) to find industry partners, vendors, and suppliers, such as housing, food and beverage, or audio/visual companies. An RFP is a request for proposals sent out by a MICE professional to possible vendors in order to host their event (Minnecci, 2019). RFPs are frequently sent to destination marketing organizations or convention and visitors bureaus at the intended event site. MICE professionals can fairly and thoroughly assess the options presented by suppliers by using consistent information found in their proposals. Using online tools, an electronic request for proposals is created. These online platforms can distribute several eRFPs for the same event at the same time, saving hours of laborious work. Still, the GBTA and CIC Workgroup (2015) found issues with the electronic procedure as well. The overwhelming amount of eRFPs was the main source of concern. How can suppliers make sure that the vast number of eRFPs is thoroughly reviewed and provide MICE professionals with the best services at the best cost?

2.4.1.4 Integrated Event Management Software

The way that MICE events are organized is evolving due to technology. Events planners work under intense pressure to produce complex, captivating events within

budget and time constraints. Through the use of tools that automate numerous manual tasks and processes, integrated event management software simplifies the planning process from start to finish. Integrated event management software offers a combination of event planning tools in one platform. This technology can help events professionals engagement, planning, promotion, and ROI measurement (Goenka, 2019). These platforms come equipped with tools that make it easier to create event-specific websites, create forms that can be customized, monitor attendance records, assist with ticket sales and registration, and create agendas, notifications, and announcements that are specific to each event. Along with audience response, lead retrieval software, mobile event apps, budgeting, and site selection tools, more all-inclusive platforms might also offer event marketing software (Celuch, 2021).

2.4.1.5 Social Media

Today, strategic marketing messages are communicated through social media channels. Every part of our daily lives is impacted by social media (Boluda et al., 2024). MICE professionals need to determine how to use various platforms to best market their event and engage their attendees. Present-day event attendees are expected to provide social media content, such as speaker bios, session descriptions, or registration links (Causin and Scamacca, 2021). While putting social media into practice is a great starting point, MICE professionals should use social media before, during, and after their events in a way that maximizes their value. Huston (2019) suggests ideas like collaborating with sponsors to create social media games, creating event branded emojis, stickers, and badges, and hash tag mosaics .

2.4.1.6 Artificial Intelligence and Machine Learning

Registration and ticketing are crucial components of the event planning process. AI can automate these processes, reducing manual work and improving efficiency (Tatulli, 2019). Furthermore, AI can significantly enhance event promotion and marketing strategies. Moreover, AI-powered algorithms can analyze user data to target potential attendees with personalized marketing messages and promotions (Kane, et. al, 2019).

In terms of operations, AI can manage various tasks such as scheduling, resource allocation, and vendor management. AI can also be used for real-time problem-solving during the event, providing instant solutions to operational challenges (Ball, 2020). Further, chatbots can gather feedback and preferences from attendees, providing insights for improving the event experience. In the context of event planning, ML can process vast amounts of data to provide insights and predictions. For instance, ML can analyze historical data to predict attendance rates, optimal ticket prices, or the success of different marketing strategies. Predictive analytics can also help planners anticipate and address potential challenges before they arise (Slater, 2020).

2.4.1.7 On-Site Technology

Technology can power the entire event when it takes place. In addition to creating a more high-tech experience, onsite technology enhances events in a variety of ways, including customization, ease, efficiency, sustainability, monetization, and data exchange (Ball, 2020). With the use of technology, attendees may have more

customized and personalized event experiences. This can be achieved by allowing them to establish their own agendas or send them personalized messages depending on their interests. Self-serve technologies provide attendees with convenience by enabling them to assist themselves in scheduling workshops or ordering specialty food and beverage items. In terms of time and cost savings, onsite technology can effectively achieve both; for example, by using remote kiosks to shorten wait times and long lines at check-in, or by using the newest printer technology to deliver badges in a matter of seconds; additionally, by maintaining digital interactions, the event's carbon footprint (Causin and Scamacca, 2021).

2.4.1.8 Event Infrastructure

It is crucial for MICE events planners to take technology requirements into account from the outset of the planning phase and throughout the negotiation process. Determining which technologies enhance and support their event is crucial. Event planners must take into account essential infrastructure, such as minimum bandwidth requirements, wired versus wireless needs, and required bandwidth levels. “Wired” is a physical Internet connection that may not be moved around. A wireless connection lacks physical wires and is easier to connect to, but not be as secure as a wired connection (Hoffman, 2017).

More information (such as emails sent and hits to social networking sites) can happen at once the more bandwidth available. MICE professionals must determine the adequate bandwidth needed to support key event interactions such as registration, Internet cafes, and digital recording/streaming media. Digital recording is the method of saving, editing, and replaying audio and visuals post-event, while streaming media allows an event audio and visual to play directly to the audience as it happens (Causin and Scamacca, 2021).

2.4.1.9 Virtual Reality and Augmented Reality

According to Banfield (2020), using VR at events is a fun and creative way for guests to interact. VR applications can be effectively integrated into both in-person and virtual events. With the use of a VR headset, attendees can interact with 3D images and become fully immersed in locations and experiences that would otherwise be unattainable (Causin and Scamacca, 2021). VR is being used by trade shows to provide interactive product demonstrations that are challenging to bring on-site while hotels and Destination Management Companies are using it to showcase their properties through virtual tours and “visits”(Thomson et al.,2021).

According to Porter and Hepplemann (2017), AR creates an enhanced version of the real world by superimposing a computer-generated image. Event planners may increase attendance by incorporating augmented reality into their events. Visitors engage with new goods, such as letting them examine how a product functions or contrasting several models to emphasize their distinctive features (Banfield, 2020).

2.4.1.10 Mobile Applications

Thousands of apps are available for events, each providing bespoke solutions for any kind of occasion (including trade shows and user conferences) (Banfield, 2020). For participants, mobile apps serve as a one-stop shop for all event-related information,

from accessing the event agenda, the attended list, general event details, and the ability to receive messages and exclusive offers from sponsors. An event-specific mobile application enhances the experience value through personalization. An app can offer enhanced communication with event attendees through personalized messaging, real-time notifications, live polling, and answers to frequently asked questions (Talantis and Shin, 2020).

The mobile app should provide all event details, such as the itinerary in its entirety, speaker bios, and the dates and times of any plenary or breakout sessions. In order to enable participants to create their own digital program agenda and plan their own supplementary activities, the app should interface with the event management software (Topsakal et al., 2022).

2.4.1.11 Internet of Things

The interconnection of everything via the Internet, devoid of restrictions on location, time, or presence, is known as the IoT. As a result, IoT makes it possible to create platforms that use participatory detection systems to transfer a variety of different types of data (Causin and Scamacca, 2021). These changes can improve event sustainability and cut waste.

Radio Frequency Identification RFID technology offers many advantages, it can be used to track an attendee's movements throughout an event, and to check people in for breakout sessions, which greatly improves the understanding of event planners regarding the interests and whereabouts of their audience. Moreover, RFID technology offers immediate data on foot traffic and going cashless, faster attendee check-in. But, most importantly, RFID allows for higher levels of engagement, because attendees can interact on-site with sponsors and other attendees through live polling and surveys (Banfield, 2020).

2.4.1.12 Registration

Modern event badging surpasses the conventional paper nametags and lanyards. Digital event badges can facilitate seamless pre-registration and on-site registration processes. Various badging technologies use radio frequency identification or near field communication (NFC) wearable badges or digital event ticketing via tokenization on mobile wallets using Apple VAS and Google Smart Tap (Event Brite, 2020, Tatulli 2019). In order to minimize queuing at registration, on-site badge printing can provide a more flexible and effective solution. Attendees find that registering and printing own badges generally takes less time than sorting through thousands or even hundreds of pre-printed badges.

2.4.2 Post-Event Technologies

MICE professionals still require technology solutions after an event to evaluate its success. Post-event surveys are a common tool used by event planners to determine goal attainment and event success. Surveys can be conducted on-site or sent virtually to attendees, post-event. The information gathered from a post-event survey can frequently reveal what attendees liked and did not like, as well as provide suggestions for future events (Boshnakova & Goldblatt, 2017). Although conducting surveys prior to, during, and following an event has clear advantages, many organizations decide to send out a single survey after the event in order to prevent overwhelming

stakeholders. If an event professional chooses to go the more popular online route, there exist several software programs that are either free or reasonably priced, featuring templates tailored to specific events. These can be further customized for the event and organization's specific data needs (Causin and Scamacca, 2021).

Post-event, AI can significantly enhance post-event analysis, providing valuable insights for future event planning. AI-powered data analytics can process and analyze vast amounts of data generated during an event (Steinberg, 2018). Additionally, AI can analyze attendee feedback to identify areas of improvement. It can evaluate marketing and promotional efforts to assess their effectiveness as well (Topsakal et al., 2022).

3. Research Methodology

3.1 Sample and Data Collection

A quantitative approach through structured interview surveys was employed to determine the current use of DT technologies in MICE events management in Egypt especially in Cairo. A structured interview is a controlled way to obtain information from interviewees. In addition, a structured interview can also be referred to as a standardized interview, or researcher-administered interview (Bryman, 2008). The questions used in a structured interview are usually closed-ended questions, pre-coded questions, and fixed-choice questions. The questions are usually specific and always provide a fixed range of responses. These questions are relatively fast and easy to administer, where respondents just put a tick in the box for the answers they select (Gill et al., 2008). The ultimate goal of this form of interview is to ensure that each session of the interview has the same or similar questions in a similar order (Bryman, 2012). Furthermore, the context of the questions is the same for all persons engaged in the research. As a result, the responses can be assembled and compared throughout the sample for relevant analysis (Gill et al., 2008). Moreover, during the interview, the interviewer may gather additional information to address the study questions.

A sample of respondents was chosen from general managers and event organizers in TOs, EMCs, and the ECCs in Cairo. Since the top 10 tour operators, according to (Companies Directory - Cairo Governorate, 2023), are organizing events alongside their main business, the researchers targeted them. Additionally, a purposeful selection of the top EMCs in 2023 was selected based on (Top Event Management Companies in Egypt, 2023). Finally, a subset of the sample consisted of managers from Cairo's four main exhibition and conference centers, which are (Egypt Expo & Convention Authority (EECA), Al Manara International Conference Center, Al Azhar Conference Center, and Al Massa Conference Centre). Cairo, Egypt's capital was selected for the case of this study because it is an important destination for MICE tourism. As mentioned earlier, it serves as a model for the whole African continent. As a result, it is frequently chosen to organize high-level events in this geo-political area, spanning from finance to political meetings, sporting events, cultural gatherings, and many other events (Abdelkafy and Hizah, 2016). Data was collected through the months of November and December 2023. This research was preceded by a pilot survey with five respondents: two tourism scholars, and three experts in MICE events to guarantee logical consistency and readability.

One personal interview was conducted in each of the previously selected entities. The received responses totaled 26 completes; 10 respondents were assigned to TOs 38.4 %, 12 belonged to EMCs 46.1 %, and 4 related to the ECCs 15.3%. Given the challenges associated with accurately estimating the size of the entire community, particularly the EMCs, it is thought to be adequate to offer broad indications of major directions with the aim of this study. As illustrated in table (2), 92% of the respondents were big companies (>100 employees). Also most of them 64% were general managers, however, 36% were event organizers, which indicates a mix of managerial and operational perspectives. Additionally, 48% have extensive experience (more than 20 years). Regarding the type of events they organize, 100% of the sample organize conferences, 88% organize exhibitions, 76% organize meetings, and 44% organize incentives.

Table (2) Sample Profile

Items		Frequency	Percent (%)
Type of Company	Tour Operators	10	38.4%
	Event Management Companies	12	46.1%
	Exhibition and Convention Centers	4	15.3%
Company Size (employees)	1-19	2	8%
	>100	23	92%
Department	General manager	61	%46
	Event organizer	9	%36
Years of Experience	<5 years	2	8%
	5-10 years	5	20%
	10-15 years	6	24%
	>20 years	12	48%
Type of Organized Event (*multiple responses)	Meetings	19	76%
	Incentives	11	44%
	Conferences	25	100%
	Exhibitions	22	88%

3.2 Measures

The research employed a descriptive-analytical methodology by using structured interviews. A survey consisting of three sections was used as a data collection tool during the interview. The first section includes the socio-demographics of managers and employees of the Egyptian tour operators and the professional conference organizations. The second section includes questions about the companies' strategy, barriers, opportunities, and disadvantages of digital transformation adoption in their work, and their willingness to adopt DT technologies over the five coming years. However, the third section includes variables representing the usage of DT technologies (Internet of things, big data, artificial intelligence, virtual reality, social media, and mobile applications) in MICE events management. All items were measured with a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The company strategy items were adopted from the Digital transformation survey (2022). However, because of the novelty of the research subject, the researchers developed the technology items according to the literature (Chumpoonta , 2022;Causin and Scamacca, 2021; Ogle and Lamb, 2019).

3.3 Statistical Procedure

In order to achieve the objectives of the current study, the researchers dealt with the data in a measurable way by using the Statistical Package for Social Sciences (SPSS. 25). The research employed the following measurable strategies: Cronbach's Alfa was used to test the reliability by comparing the amount of shared variance, or covariance, among the questionnaire items to the amount of overall variance. Frequencies, percentage, means and standard deviation were used to describe the characteristics of the study population in relation to the relevant variables and to ascertain how its members respond to the research questions. ANOVA test was used to explore the difference between the three examined entities towards using the DT techniques. Lastly, the relationship between DT technologies and the type of event was investigated using spearman's Rho Co-relations.

3.4 Data Validity and Reliability

3.4.1 Validity

Validity explains how well the collected data covers the actual area of investigation (Ghauri and Gronhaug, 2005). Validity means “measure what is intended to be measured”. This research employed the content validity, content validity is defined as the degree to which items in an instrument reflect the content universe to which the instrument will be generalized (Straub, Boudreau et al., 2004). Researchers employed the judgmental approach to establish content validity; it involves literature reviews and then follow-ups with the evaluation by expert judges or panels. In this context, researchers send the questionnaire to two scholars and three experts in MICE events. Afterward, the questionnaire was revised and modified.

3.4.2 Reliability

Cronbach's alpha was used to measure the validity of the questionnaire for this study. Cronbach's alpha, also known as coefficient alpha, is a measure of reliability, specifically internal consistency reliability or item interrelatedness, of a scale or test (e.g., questionnaire). Internal consistency refers to the extent that all items on a scale or test contribute positively toward measuring the same construct. As such, internal consistency reliability is relevant to composite scores. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer the coefficient is to 1.0, the greater is the internal consistency of the items (variables) in the scale. Following George and Mallery's (2003) rule: > 0.9 (Excellent), > 0.8 (Good), > 0.7 (Acceptable), > 0.6 (Questionable), > 0.5(Poor), and < 0.5 (Unacceptable), the scale of the study is Excellent, see table 3.

Table (3) Reliability of the Questionnaire

Variables	No. of Items	Cronbach's Alpha Value	Validity Coefficient
Company Strategy	23	0.868	0.932
DT Technologies	24	0.938	0.979
Total	47	0.946	0.9255

4. Results

4.1 Descriptive Analysis

4.1.1 Strategy and Organization

As mentioned earlier the sample includes three entities (TOs, EMCs, and ECCs). Table (4) declares the means and the standard deviations of the strategy and organization of these three entities regarding the adoption of DT technologies in their organizations.

Table (4) Strategy and Organization

Items		Mean	SD	Attitude
Our organization’s management is familiar with digital transformation tools	TOs	4.6000	.51640	Strongly Agree
	EMCs	4.3333	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree
Our organization’s management has a clear vision for utilizing digital transformation in the future	TOs	4.2000	.78881	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECC	4.0000	1.00000	Agree
Our organization’s management supports the utilization of digital transformation	TOs	4.2000	.78881	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Digital transformation has become an important part of our business operation	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Digital transformation enhances our business.	TOs	4.4000	.51640	Agree
	EMCs	4.3333	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree

Regarding TOs, the statement “Our organization’s management is familiar with digital transformation tools” calculated the highest mean (4.6000), however, the statement “Digital transformation has become an important part of our business operation.” Calculated the lowest mean (4.0000). Regarding EMCs, the two statements “Our organization’s management is familiar with digital transformation tools” and “Digital transformation enhances our business” calculated the highest means (4.3333). Yet, the mean for the rest of the statements is the same (4.0000). Regarding the ECCs, the statement "Digital transformation enhances our business" calculated the highest mean. Moreover, the TOs calculated the highest means in almost all of the statements; however, both EMCs and ECCs means are almost the same.

Table (5) Barriers of Adopting DT Technologies in Mice Events Management

Items		Mean	SD	Attitude
Low funds	TOs	3.6000	.84327	Agree
	EMCs	3.3333	1.30268	Neutral
	ECCs	3.6667	.57735	Agree
No expert knowledge	TOs	3.8000	.42164	Agree
	EMCs	3.6667	.49237	Agree
	ECCs	3.3333	1.15470	Neutral

Continued

Table (5) continued

Items		Mean	SD	Attitude
No infrastructure	TOs	3.4000	.84327	Agree
	EMCs	3.3333	.49237	Neutral
	ECCs	3.6667	1.52753	Agree
No proper management	TOs	2.8000	.78881	Neutral
	EMCs	3.3333	.49237	Neutral
	ECCs	2.6667	1.15470	Neutral
Missing willingness to change	TOs	3.4000	.84327	Agree
	EMCs	3.3333	.57735	Neutral
	ECCs	3.4000	.84327	Agree
Regulations	TOs	3.6000	1.07497	Agree
	EMCs	3.6667	.49237	Agree
	ECCs	3.6667	1.52753	Agree

Table (5) presents the means and standard deviations of the barriers to adopting DT technologies in MICE events management. TOs calculated the highest mean (3.8000) with the statement “No expert knowledge”; EMCs calculated the highest means (3.6667) with the two statements “No expert knowledge” and “Regulations”; ECCs calculated the highest means (3.6667) with the three statements “ Low funds”, “No infrastructure”, and “regulations”.

Table (6) Opportunities of Adopting DT Technologies in Mice Events Management

Items		Mean	SD	Attitude
Increase revenue	TOs	4.2000	.42164	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Improve customer satisfaction	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Reduce operating costs	TOs	4.2000	.78881	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Increase business speed and agility	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree
Increase market share	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.0000	1.00000	Agree

Continued

Table (6) continued

Items		Mean	SD	Attitude
Reduce the development time for new events	TOs	3.8000	1.03280	Agree
	EMCs	4.0000	.85280	Agree
	ECCs	3.6667	.57735	Agree
Improve amount of better talent hired and retained	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.0000	.85280	Agree
	ECCs	4.3333	1.15470	Strongly Agree

Table (6) indicates the means and standard deviations of the opportunities of adopting DT technologies in MICE events management. According to the TOs, the means ranged between (4.4000- 3.8000), however, the means of the EMCs towards all the statements are all the same. Ultimately, the means according to ECCs ranged between (4.333-3.6667), the statement “Improve amount of better talent hired and retained” ranked the highest mean and the statement of “Reduce the development time for new events” ranked the lowest mean.

Table (7) Disadvantage of Adopting DT Technologies in Mice Events Management

Items		Mean	SD	Attitude
Data security and privacy concerns	TOs	2.8000	1.22927	Neutral
	EMCs	3.3333	.98473	Neutral
	ECCs	3.6667	1.52753	Agree
Social separation and lack of human contact	TOs	3.2000	.78881	Neutral
	EMCs	3.3333	.98473	Neutral
	ECCs	4.0000	.00000	Agree
Job insecurity	TOs	2.8000	1.03280	Neutral
	EMCs	3.6667	1.30268	Agree
	ECCs	3.3333	1.52753	Neutral
Increased work pressure due to the large amount of data to be analyzed	TOs	3.2000	1.03280	Neutral
	EMCs	3.6667	1.30268	Agree
	ECCs	3.6667	1.52753	Agree
The life span of technological devices and the cost of maintaining them	TOs	2.8000	1.03280	Neutral
	EMCs	3.0000	.85280	Neutral
	ECCs	4.0000	.00000	Agree

Table (7) indicates the disadvantages of adopting DT technologies in MICE events management. With regard to TOs, “Social separation and lack of human contact” and “increased work pressure due to the large amount of data to be analyzed” calculated the highest means (3.2000). According to EMCs, “Job insecurity” and “increased work pressure due to the large amount of data to be analyzed” calculated the highest means (3.6667). However, according to ECCs “Social separation and lack of human contact” and “the life span of technological devices and the cost of maintaining them” calculated the highest means (4.0000).

Table (8) Entities Willingness to Adopt DT Technologies over the next 5 years

	Mean	SD	Attitude
TOs	4.2000	.42164	Strongly Agree
EMCs	3.6667	.49237	Agree
ECCs	4.0000	1.00000	Agree

Table (8) shows the three entities' willingness to adopt DT Technologies over the next 5 years. As shown, TOs are intended to adopt DT technologies over the next 5 years (4.2000) followed by ECCS (4.000), and lastly EMCs (3.6667).

4.1.2 Technology

Table (9) The Extent to which Entities are Using DT Technologies in MICE Events Management

The extent of using DT	Mean	SD	Attitude
TOs	3.4000	.84327	Agree
EMCs	2.6667	1.30268	Neutral
ECCs	3.0000	1.73205	Neutral

Table (9) indicates the extent to which the three entities are using DT Technologies in MICE events management. As shown from the table TOs are frequently using DT Technologies (3.4000), followed by ECCs (3.0000) and EMCs (2.6667).

4.1.2.1 DT Technologies Used in MICE Events Management

This section declares the usage of different DT technologies in MICE events management within the three entities (TOs, EMCs, and ECCs).

Table (10) Internet of Things

IoT		Mean	SD	Attitude
We use integrated event management software to save time and help with good event planning	TOs	3.8000	.78881	Agree
	EMCs	4.0000	.00000	Agree
	ECCs	4.0000	.00000	Agree
We use RFID technology for speedy entry of participation, cashless uses, as well as to track attendance and staff	TOs	4.0000	.66667	Agree
	EMCs	4.0000	.00000	Agree
	ECCs	4.0000	.00000	Agree
We ensure that all modern technological means are available at the event site, which enhances the event experience	TOs	3.8000	1.03280	Agree
	EMCs	3.3333	.49237	Neutral
	ECCs	3.6667	.57735	Agree
We complete most of our business procedures (such as payment and completion of transactions) using modern technological means via the Internet	TOs	4.4000	.84327	Strongly Agree
	EMCs	4.3333	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree
We send questionnaire forms via emails or social media channels to evaluate events	TOs	3.8000	.78881	Agree
	EMCs	3.6667	.49237	Neutral
	ECCs	3.6667	.57735	Agree

Table (10) presents the use of the Internet of Things in MICE events management. Specifically, the statement “We complete most of our business procedures (such as

payment and completion of transactions) using modern technological means via the Internet” calculated the highest mean within the three entities TOs (4.4000), EMCs (4.3333), and ECCs (4.3333). Additionally, the statement “We use RFID technology for speedy entry of participation, cashless uses, as well as to track attendance and staff” calculated the same mean across the three entities (4.000).

Table (11) Big Data

BD		Mean	SD	Attitude
We use information portals to collect the necessary data and compare the latest technological technologies used in the events industry	TOs	3.8000	.78881	Agree
	EMCs	3.9167	.66856	Agree
	ECCs	2.6667	.57735	Neutral
We use the big data to search for virtual places and locations for events instead of conducting field visits to them	TOs	4.0000	.66667	Agree
	EMCs	4.0833	.51493	Agree
	ECCs	2.6667	.57735	Neutral
We use the big data to search for suppliers, exhibitors, catering , etc.	TOs	3.8000	1.03280	Agree
	EMCs	3.8333	.83485	Agree
	ECCs	3.6667	.57735	Agree
Big data and analytics provide real-time decision-making, predictive insights, and beneficial environmental impacts	TOs	4.4000	.84327	Strongly Agree
	EMCs	4.3333	.77850	Strongly Agree
	ECCs	3.3333	.57735	Agree
Big data and analytics are used to predict the success of events	TOs	3.8000	.78881	Agree
	EMCs	3.8333	.71774	Agree
	ECCs	2.3333	2.30940	Disagree

Table (11) illustrates the use of big data in MICE events management. The statement “Big data and analytics provide real-time decision-making, predictive insights, and beneficial environmental impacts” calculated the highest mean according to both TOs and EMCs (4.4000, 4.3333 respectively). However, the statements “We use the big data to search for suppliers, exhibitors, catering, etc” and “Big data and analytics are used to predict the success of events” calculated the lowest means for both. Further, the statement “We use the big data to search for suppliers, exhibitors, catering, etc.” calculated the highest mean according to ECCs (3.6667), and the statement “Big data and analytics are used to predict the success of events”calculated the lowest mean (2.3333).

Table (12) Artificial Intelligence

AI		Mean	SD	Attitude
We use artificial intelligence and chatbots to help customers get the necessary answers to their inquiries and help them make decisions	TOs	2.4000	1.07497	Disagree
	EMCs	3.3333	.49237	Neutral
	ECCs	2.4000	1.07497	Disagree

Continued

Table (12) continued

AI		Mean	SD	Attitude
We use artificial intelligence to recognize faces while entering the event site as a security and safety measure	TOs	2.8000	1.54919	Neutral
	EMCs	3.3333	.49237	Neutral
	ECCs	2.8000	1.54919	Neutral
We use digital badges and QR codes to facilitate and speed up entry to the event site	TOs	3.4000	.84327	Agree
	EMCs	4.0000	.00000	Agree
	ECCs	3.4000	.84327	Agree
We use automated speakers for translation at some events	TOs	3.4000	1.07497	Agree
	EMCs	3.3333	.49237	Neutral
	ECCs	2.4000	1.07497	Disagree
We use a robot to perform some tasks at the event site	TOs	2.2000	1.22927	Disagree
	EMCs	2.6667	1.30268	Neutral
	ECCs	2.2000	1.22927	Disagree

Table (12) indicates the use of artificial intelligence in MICE events management. Regarding TOs, the statements “We use digital badges and QR codes to facilitate and speed up entry to the event site” and “We use automated speakers for translation at some events” calculated the same highest mean (3.4000). Moreover, the statement “We use digital badges and QR codes to facilitate and speed up entry to the event site” calculated the highest means for both EMCs and ECCs (4.0000, 3.4000 respectively).

Table (13) Virtual Reality

VR		Mean	SD	Attitude
We apply virtual reality and augmented reality to enhance the event experience	TOs	2.6000	1.26491	Neutral
	EMCs	2.6667	.98473	Neutral
	ECCs	3.0000	1.73205	Neutral
We use virtual reality and augmented reality for both live and remote events	TOs	3.4000	1.26491	Agree
	EMCs	3.3333	1.77525	Neutral
	ECCs	3.6667	2.30940	Agree
Virtual reality is used in exhibitions, especially in interactive displays of products that are difficult to bring to the event site	TOs	3.6000	1.07497	Agree
	EMCs	3.3333	1.77525	Neutral
	ECCs	3.3333	2.08167	Neutral

Table (13) demonstrates the use of virtual reality in MICE events management. According to TOs, the statement “Virtual reality is used in exhibitions, especially in interactive displays of products that are difficult to bring to the event site” calculated the highest mean (3.6000). However, the statements “We use virtual reality and augmented reality for both live and remote events” and “Virtual reality is used in exhibitions, especially in interactive displays of products that are difficult to bring to the event site” calculated the same highest means (3.3333) according to EMCs. Further, the statement “We use virtual reality and augmented reality for both live and remote events” calculated the highest mean (3.6667) according to ECCs.

Table (14) Social Media

SM		Mean	SD	Attitude
We use social media channels to market the event and disseminate information about it	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree
We use social media sites to get volunteers to organize the event	TOs	2.8000	1.54919	Neutral
	EMCs	4.0000	1.47710	Strongly Agree
	ECCs	3.3333	1.52753	Neutral
We use social media sites to attract the sponsors of the events and market to them	TOs	3.2000	1.22927	Neutral
	EMCs	3.6667	1.30268	Agree
	ECCs	4.0000	1.73205	Strongly Agree
We sometimes publish the registration link for the event through social media	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree
We use social media sites to communicate with the audience, followers and attendees of the event	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree
We employ the use of social media to publicize the event activities by publishing live broadcast videos and photos	TOs	4.4000	.51640	Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree
We use social media sites to monitor audience feedback to the event	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.6667	.57735	Strongly Agree

Table (14) declares the use of social media in MICE events management. Both statements “We use social media sites to get volunteers to organize the event” and “We use social media sites to attract the sponsors of the events and market to them” calculated the lowest means within the three entities; TOs (2.8000, 3.2000), EMCs (2.8000, 3.2000), and ECCs (3.3333, 4.0000). Yet, the rest of the statements calculated high means with a strongly agree attitude.

Table (15) Mobile Applications

MA		Mean	SD	Attitude
We use social mobile applications to communicate with attendees, organizers, volunteers and sponsors (for example, WhatsApp)	TOs	4.4000	.51640	Strongly Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree

Table (15) continued

MA		Mean	SD	Attitude
We create mobile application for the event and publish it to the public and attendees	TOs	4.0000	1.15470	Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree
We use mobile applications for participants to access specific information about the event (e.g. event agenda, dates of plenary and side sessions, and view attendee list.	TOs	4.2000	.78881	Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree
Attendees sometimes receive special offers from sponsors through mobile applications.	TOs	4.0000	1.15470	Agree
	EMCs	4.6667	.49237	Strongly Agree
	ECCs	4.3333	.57735	Strongly Agree

Table (15) shows the use of mobile applications in MICE events management. Regarding the TOs, the means ranked between (4.4000- 4.0000), the statement “We use social mobile applications to communicate with attendees, organizers, volunteers and sponsors (for example, WhatsApp)” calculated the highest mean (4.4000). However, all the statements calculated the same means according to EMCs (4.6667) and ECCs (4.3333).

Table (16) Total Means and Standard deviation of DT Technologies

	IoT	BD	AI	VR	SM	MA
Mean	3.9120	3.9600	3.0400	3.1733	4.2514	4.4200
N	26	26	26	26	26	26
Sd	0.49356	0.61644	0.82260	1.16714	0.66276	0.69866

Total Means and standard deviation were calculated to explore the most used DT technologies in MICE events management in Egypt, see table (16). The findings indicate that the use of mobile applications is the most prevalent or favored DT technology, with an average score of 4.4200. Social media is the second-highest used DT technology, with a mean score of 4.2514. Big data is the third most used DT technology with a mean score of 3.9600. Internet of Things is the fourth most used DT technology with a mean score of 3.9120. Virtual reality is the fifth with a mean score of 3.1733. Finally, artificial intelligence is the sixth and last, with a mean score of 3.0400.

4.2 Difference between the Three Entities toward Using DT Technologies

Table (17) One-Way ANOVA

		Sum of Squares	df	Mean square	F	Sig.
IoT	Between groups	0.049	2	0.25	0.093	0.911
	Within groups	5.797	22	0.264		
	Total	5.846	24			

The mean difference is significant at the 0.05 level.

Continued

Table (17) continued

		Sum of Squares	df	Mean square	F	Sig.
BD	Between groups	0.096	2	0.48	0.117	0.890
	Within groups	9.024	22	0.410		
	Total	9.120	24			
AI	Between groups	3.189	2	1.595	2.688	0.090
	Within groups	13.051	22	0.593		
	Total	16.240	24			
VR	Between groups	0.130	2	0.065	0.044	0.957
	Within groups	32.563	22	1.480		
	Total	32.693	24			
SM	Between groups	1.059	2	0.530	1.228	0.312
	Within groups	9.483	22	0.431		
	Total	10.542	24			
MA	Between groups	1.482	2	0.741	1.593	0.226
	Within groups	10.233	22	0.465		
	Total	11.715	24			

The mean difference is significant at the 0.05 level.

Table (17) shows the difference between TOs, EMCs and ECCs towards using the DT technologies in MICE events management. The results of the one-way ANOVA test revealed that there is no significant difference between the three entities towards using any of the DT technologies in MICE events. The p-value obtained from the test is greater than 0.05, which typically indicates that any observed differences in means are not statistically significant.

4.4 Correlation between Digital Transformation Technologies and Types of Events

Table (18) Spearman’s Rho

			IoT	BD	AI	VR	SM	MA
Spearman’s Rho	Types of Events	Correlation coefficient	0.203	-0.124	-0.207	0.212	0.072	-0.083
		Sig(2-tailed)	0.331	0.556	0.320	0.310	0.732	0.694
		N	26	26	26	26	26	26

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Table (18) shows the relation between digital transformation technologies and types of events. In statistical terms, this means that based on the data analyzed, there is no evidence to support a correlation or association between the specific type of event (such as meetings, incentives, conferences, or exhibitions) and the application of any digital transformation technique.

4.5 The Interviewees' Suggestions for Adopting DT Technologies in the MICE Industry

Interviewees suggest some recommendations that might aid the adoption of DT technologies in the MICE industry mentioned as follows:

According to the TOs, they demonstrated that specialized training and education through specialized companies affiliated with state ministries to provide training and education is a proactive step to ensure that professionals involved in event management are equipped with the necessary skills to leverage digital technologies effectively. Moreover, they suggest offering free or low-cost platforms to encourage companies to adopt digital services that can democratize access to technology and foster widespread adoption, especially among smaller entities that may have budget constraints.

However, EMCs emphasized that increasing awareness of the advantages and benefits of digital transformation is crucial, additionally, they highlight the crucial role of technological development in the modern era, emphasizing the necessity of keeping pace with these advancements. The importance of applying technology is particularly underscored in the context of events, especially those characterized by globalization.

Lastly, ECCs recommended first, the issuance of new laws or legislation and incentive systems to demonstrate government commitment to digital transformation that can create a supportive environment and encourage businesses to invest in upgrading their technological capabilities. Second, regularly updating computer systems and strengthening Internet networks are essential for ensuring that the infrastructure supports the latest digital technologies to enhance the overall efficiency and effectiveness of digital transformation initiatives. Third, lowering Internet prices and improving speed are key factors in making digital technologies more accessible and efficient; this not only benefits event management but also contributes to the broader adoption of digital solutions across various sectors. Fourth, providing technical support and financial assistance for packages, programs, and training related to digital transformation is a practical way to address the financial challenges associated with adopting new technologies.

5. Discussion

This paper aims at exploring the extent of DT technology adoption in the Egyptian event industry and identifying the prevalent DT technologies in Egypt. Moreover, discussing the available opportunities and main barriers to applying DT in the MICE industry. First, regarding the three entities' (TOs, EMCs, and ECCs) strategy and organization, several statements across all entities, such as "Our organization's management is familiar with digital transformation tools" and "Digital transformation enhances our business," have high mean scores. This suggests a positive perception and a sense of familiarity with DT tools. While there might be variations in mean scores among TOs, EMCs, and ECCs, the overall trend seems to be positive across all entities, with some differences in emphasis on specific aspects of digital transformation. The mention of "future use" of DT technologies implies a forward-looking perspective. Even if certain aspects have lower mean scores, the focus on future utilization suggests an openness to incorporating digital transformation more extensively in the coming times. This bodes well for the potential growth and integration of digital transformation practices within the MICE events industry.

The findings highlight both commonalities and variations in the perceptions of barriers, opportunities, and disadvantages among TOs, EMCs, and ECCs. These results indicate the perceived barriers to adopting DT techniques in MICE events management as assessed by different entities. It seems that "No expert knowledge" is a common concern across all three groups, while EMCs and ECCs additionally highlight "Regulations" as a significant barrier. ECCs also identify "Low funds" and "No infrastructure" as major challenges. On the other hand, while TOs indicate a range of means for different opportunities; EMCs seem to have the same mean for all opportunities, and ECCs show a range of means with specific emphasis on the importance of improving talent acquisition and retention. The opportunities are summarized as follows, Increase revenue, improve customer satisfaction, reduce operating costs, increase business speed and agility, increase market share, reduce the development time for new events, and improve the amount of better talent hired and retained. Further, each group highlights different concerns regarding the disadvantages of adopting DT technologies in MICE events management. For TOs, it is about social aspects and increased workload. EMCs are concerned about job insecurity and increased workload as well. ECCs, on the other hand, are more focused on social aspects and the longevity and maintenance costs of technological devices. With these results, the study provides a nuanced understanding of the complex landscape surrounding the adoption of DT in MICE events management, offering valuable insights for stakeholders and decision-makers in the industry.

The findings also provide valuable insights into the forward-looking perspectives of different entities within the MICE industry regarding the adoption of digital transformation technologies. The findings suggest that, among the three entities, TOs have the highest level of willingness to adopt DT technologies over the next 5 years. ECCs also show a substantial willingness, though slightly lower than that of TOs. EMCs express the lowest level of willingness among the three entities. Understanding the willingness of entities to adopt DT technologies provides a foundation for informed decision-making and strategic planning. It enables proactive measures to capitalize on opportunities, address challenges, and drive the successful integration of digital transformation in the MICE events management landscape.

Additionally, the findings contribute to a comprehensive understanding of the current state of DT usage in MICE events management. The findings suggest that TOs are

leading in the extent of using DT techniques, with a mean score indicating frequent usage. ECCs also show a substantial extent of using DT techniques, though slightly less frequently than TOs. However, EMCs exhibit a lower extent of using DT technologies compared to the other entities. The higher extent of using DT technologies by TOs suggests a proactive approach to technology adoption and innovation within the event-organizing sector. Further, the significant extent of using DT technologies by ECCs indicates that consultants are actively incorporating technology into their event coordination and consulting services. Yet, the lower extent for EMCs may point to challenges or barriers to the adoption of DT technologies within their companies. Addressing these challenges could be a strategic focus for EMCs. Ultimately, entities with a higher extent of using DT technologies may serve as valuable collaborators or partners for those at a lower extent. This could lead to knowledge-sharing, best practices exchange, and collaborative efforts to enhance DT adoption across the industry. These implications and considerations aim to guide entities in optimizing their approaches to digital transformation in the MICE events management industry, fostering innovation, collaboration, and continuous improvement.

Regarding the use of IoT in MICE event management, the consistently high means across all three entities indicate a strong and prevalent use of IoT technology in MICE events management. The specific business procedure mentioned, such as payments and transactions, suggests a key area where IoT is actively applied. This could include online registration systems, mobile payment solutions, and other IoT-enabled transactional processes. Additionally, the consistency in mean scores across the entities suggests a uniform agreement or perception regarding the use of RFID technology for various purposes in the context of MICE events management. It indicates that, the three entities view the implementation of RFID technology positively for enhancing entry efficiency, facilitating cashless transactions, and monitoring attendance and staff. In this context, (Mankad & Upadhyay, 2022) in their study demonstrate that utilizing such technology is more valuable and effective than other system or software. This finding can be valuable for stakeholders and decision-makers, providing insights into the current state of IoT adoption and indicating areas of success and focus within MICE events management.

Both TOs and EMCs prioritize the use of big data for real-time decision-making, predictive insights, and beneficial environmental impacts. However, ECCs place a higher emphasis on using big data to search for suppliers, exhibitors, catering, etc., compared to predicting the success of events. The lower mean for the statement "Big data and analytics are used to predict the success of events" suggests that there might be opportunities for improvement or increased focus on leveraging big data for predicting event success, particularly for EMCs. The variation in priorities among TOs, EMCs, and ECCs opens up possibilities for collaboration and knowledge-sharing. Consequently, entities may benefit from sharing best practices related to specific aspects of big data usage in MICE events management.

Regarding the use of AI in MICE events management, the statement "We use digital badges and QR codes to facilitate and speed up entry to the event site" consistently receives the highest mean across all three entities (TOs, EMCs, and ECCs). This suggests a common recognition of the value and effectiveness of using AI-driven tools for entry facilitation. While both statements related to AI applications receive the same highest mean for TOs, the use of automated speakers for translation at some events is not specified for EMCs and ECCs. This indicates potential variations in the

adoption or emphasis on AI-driven translation solutions among the entities. Moreover, the emphasis on using digital badges and QR codes for entry suggests a shared focus on enhancing efficiency and embracing innovative solutions for managing event logistics across the industry. Those findings provide valuable insights into the specific applications of artificial intelligence in MICE events management and can guide entities in optimizing the use of AI-driven solutions for improved efficiency and attendee experience.

Concerning the use of VR in MICE events management, TOs focus on the utilization of virtual reality in exhibitions, particularly for interactive displays of products that may be challenging to bring to the event site physically. This suggests a strategic use of VR to enhance the exhibition experience. Meanwhile, EMCs place equal emphasis on the use of virtual reality and augmented reality for both live and remote events. This indicates a versatile approach, leveraging VR technologies across various event formats. ECCs also express a higher emphasis on using virtual reality and augmented reality for both live and remote events. This could signify recognition of the potential for immersive technologies to enhance engagement in different event settings. The variations in emphasis among TOs, EMCs, and ECCs offer opportunities for synergies and collaboration. The overall focus on virtual reality and augmented reality across all entities indicates a growing trend in the adoption of immersive technologies to enhance the event experience, whether in exhibitions, live events, or remote settings. These findings were consistent with those of the (Thomson et al., 2021) study, which was conducted in Australia. These findings provide insightful information about how different entities within the MICE industry are incorporating virtual reality into their events, showcasing a spectrum of applications and strategic priorities.

With regard to social media, the results revealed that POs, EMCs, and ECCs calculated high means with a strongly agreeing attitude toward the use of social media in MICE events management. The results revealed that the three entities have a proactive approach to leveraging social media for overall event promotion and information dissemination. Moreover, the results indicate that there is a strategy followed by the three parties to convert social media engagement directly into event registrations. Furthermore, it proved that communication through social media platforms fosters engagement and interaction with the audience, followers, and event attendees, and hence enhances the overall participant experience. Additionally, live broadcasting and sharing visual content on social media contribute to creating a dynamic and immersive experience for a wider online audience. Ultimately, monitoring audience feedback on social media is a valuable practice for gauging attendee satisfaction, identifying areas for improvement, and addressing concerns in real-time. These results are in line with previous studies on the role of social media in events planning and marketing, such as (Boluda et al., 2024). These findings provide valuable insights into the current utilization and perceived effectiveness of social media strategies in MICE events management, therefore, the full potential of social media should be leveraged to promote, manage, and enhance the overall success of MICE events.

Regarding the use of mobile applications, the high means with a strongly agreeing attitude to all the statements related to the use of mobile applications in MICE events management suggest a positive and enthusiastic response from PCOs, EMCs, and ECCs. The agreement indicates recognition of the effectiveness of social mobile applications, such as WhatsApp, as a communication tool for various stakeholders

involved in the event. Further, the strong agreement suggests a proactive approach to developing and making event-specific mobile applications publicly available, emphasizing accessibility and information dissemination. Moreover, it highlights the importance of providing participants with a centralized and accessible platform through mobile applications for accessing crucial event information. Finally, it indicates recognition of the value of leveraging mobile applications as a channel for sponsors to provide special offers to attendees, potentially enhancing attendee engagement and sponsor visibility. The positive responses indicate a strong alignment with the use of mobile applications in MICE events management. These results were consistent with previous research such as (Talanta and Shin, 2020). By consistently refining and optimizing mobile application strategies, entities can capitalize on the benefits of technology to enhance participant experiences and overall event success.

After reviewing the usage of each DT technology in MICE events management, a comparison between the total means of DT technologies was made. The results suggest that, according to the data obtained, mobile applications and social media are the most widely adopted DT technologies in MICE events management in Egypt, while artificial intelligence and virtual reality are less prevalent, though still exist. These findings can inform decision-makers and stakeholders about the prevailing trends in the application of digital technologies in the events industry in Egypt.

The key finding from the one-way ANOVA test indicated that there is no significant difference between the three entities (TOs, EMCs, and ECCs) regarding their use of any of the digital transformation technologies in MICE events. The p-value obtained from the test is > 0.05 , suggesting that there is no statistically significant variation in the use of DT technologies among the three groups. In practical terms, this implies that, based on the data analyzed, the attitudes and practices related to digital transformation technologies in MICE events management are similar across TOs, EMCs, and ECCs. The lack of statistical significance indicates that any observed differences in means are likely due to random chance rather than meaningful distinctions between the groups.

The results also confirmed that there is no relation between the types of events (meetings, Incentives, Conferences, and exhibitions) and any of the DT technologies. This suggests that, based on the data analyzed, the nature or category of an event does not influence the adoption or application of digital transformation technologies. In other words, digital transformation technologies seem to be equally applicable across different types of events, and the choice to employ these technologies may not be significantly influenced by the specific characteristics of the event. This might suggest a universal or adaptable approach to digital transformation in the MICE industry.

6. Conclusion and Implementations

This paper aims to identify the current use of digital transformation technologies within the MICE industry in Egypt. A total of 26 responses were obtained from managers and event organizers in Egyptian tour operators, event management companies, and exhibition and conference centers in Egypt. Data were analyzed with the aid of the statistical package SPSS.25 to measure the attitudes of these entities towards using digital transformation technologies in MICE events in Egypt. This paper offers a significant contribution to understand the extent to which digital transformation technologies are employed in the MICE industry in Egypt, which in turn will help the Egyptian government and tourism stakeholders in planning for strategies to adopt these technologies in the future.

DT technologies are used within the events industry to enhance, aid, and develop the event experience. The three examined entities (TOs, EMCs, and ECCs) demonstrated their awareness of DT technologies (IoT, BD, AI, VR, SM, and MA) and assured that using DT technologies enhances their own business. However, it could be said that Egypt is not digitally mature in the MICE events sector. The primary types of DT technologies being used in the MICE industry in Egypt are mobile applications and social media, followed by the Internet of Things and big data in a smaller scale. The opportunities of adopting DT technologies in The MICE industry are vastly exceeding the challenges. The findings revealed opportunities such as increasing business speed and agility, increasing market share, as well as improving the amount of talent that will be hired and retained. Moreover, adoption of DT technologies in The MICE industry will help to increase revenues, improve customer satisfaction, and reduce operating costs. Noteworthy that all of the preceding opportunities have been noticed to be affecting the scope and the shape of MICE events business in Egypt. On the other hand, there are some challenges that faces the adoption of DT technologies in the MICE industry, for example, the regulations, the huge needed funds, and the absence of expert knowledge. Further, there are also some disadvantages found to be affecting the MICE industry while adopting DT technologies. First, social separation and lack of human contact; second, increased work pressure due to the large amount of data to be analyzed; third, data security and privacy concerns; and finally job insecurity. Despite this, TOs, EMCs, and ECCs in Egypt have shown their willingness to adopt DT technologies in the MICE industry over the next 5 years.

Since change is inevitably coming, this study identified various implementations that should help the adoption of DT technologies in the MICE industry, summarized as follows:

- **Increase Awareness:** Promoting awareness of DT and its significance is crucial. This involves educating stakeholders about the benefits and opportunities it brings to the MICE (Meetings, Incentives, Conferences, and Exhibitions) industry. This campaign should target both leadership and staff to ensure a holistic understanding.
- **Motivate Change:** Motivating all stakeholders to embrace change is a pivotal step. Leaders need to inspire a positive mindset towards DT, highlighting its potential to enhance efficiency, innovation, and overall business success. Communicating the advantages and addressing potential concerns can help build a collective commitment to change.
- **Invest Resources:** Devoting significant resources is essential for successful DT adoption. This includes financial investments in technology infrastructure, software, and skilled personnel. Adequate resources are key to overcoming challenges and ensuring a smooth transition to digital processes.
- **Training and Skill Development:** Investing in training programs, workshops, and partnerships with educational institutions or technology providers is vital. This step ensures that staff members acquire the necessary skills to effectively utilize new technologies. Further, continuous learning and development programs help keep entities updated on emerging DT trends.

- Industry-Wide Standards: Developing industry-wide standards for DT adoption and usage is a forward-thinking approach. Standards facilitate benchmarking efforts, enabling entities to assess their progress, compare performance against established norms, and set realistic goals. This fosters a more cohesive and standardized approach across the industry.
- Regulations and Legislation: Issuing new regulations and legislation to activate the usage of DT in Egypt is a crucial step. Government support through clear policies and regulations creates a conducive environment for technological advancements. This can include incentives, tax breaks, or other measures to encourage businesses to adopt DT.

Ultimately, some ideas for future research could be suggested by the limitations of the current research. It should be noted that not all of this study's findings are verified with the findings of other studies. This is because there is little empirical research in this area, and most of the previous work in this field is confined to theoretical frameworks. Consequently, the authors propose some ideas that could potentially add to the scientific literature on this topic. Researchers should investigate the organizational readiness of the events management entities to adopt different DT technologies in their business. Future research will also need to look into DT technology acceptance from managers' perspectives and explore how it will affect the employment environment. On the other hand, more investigation needs to be done from customers' perspective to explore how adopting DT technologies will affect the event experience.

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نحو تطبيق تقنيات التحول الرقمي في صناعة الاجتماعات والحوافز والمؤتمرات والمعارض في مصر

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الملخص:

لقد أحدث التحول الرقمي (DT) ثورة في طريقة إدارة الأحداث، بدءًا من مؤتمرات الشركات وحتى المهرجانات الموسيقية وحفلات الزفاف، وما إلى ذلك. وعلى الرغم من التقدم الهائل في التحول الرقمي، فإن الأبحاث حول التحول الرقمي في صناعة الأحداث محدودة للغاية، وهي فجوة تم سدها جزئيًا بهذا البحث. وعلى وجه التحديد، يهدف هذا البحث إلى استكشاف مدى استخدام تقنيات التحول الرقمي في صناعة الاجتماعات والحوافز والمؤتمرات والمعارض في مصر، بالإضافة إلى تحديد تقنيات التحول الرقمي الأكثر استخدامًا في إدارة الاجتماعات والحوافز والمؤتمرات والمعارض في مصر. علاوة على ذلك، مناقشة الفرص المتاحة والعوائق الرئيسية لتطبيق التحول الرقمي في صناعة الاجتماعات والحوافز والمؤتمرات والمعارض. ولتحقيق ذلك، اعتمد المنهج النوعي في هذه الدراسة على مقابلات منظمة أجريت باستخدام استمارة استبيان. تم استهداف عينة مكونة من 26 استجابة من المديرين ومنظمي الأحداث في شركات السياحة المصرية (TOS)، وشركات إدارة الأحداث (EMCs)، ومراكز المعارض والمؤتمرات (ECCs). تم تحليل الاستجابات باستخدام الإحصاء الوصفي، وتحليل التباين الأحادي (ANOVA)، وتحليل ارتباط سبيرمان رو بدعم من برنامج SPSS 26. وكشفت النتائج أنه على الرغم من الوعي بتقنيات التحول الرقمي، إلا أنها لا تزال غير مستخدمة على نطاق واسع في مجال إدارة الاجتماعات، والحوافز، والمؤتمرات والمعارض في مصر. علاوة على ذلك، فإن الأنواع الأساسية لتطبيقات التحول الرقمي المستخدمة في صناعة الاجتماعات، والحوافز، والمؤتمرات والمعارض في مصر هي تطبيقات الهاتف المحمول ووسائل التواصل الاجتماعي، يليها إنترنت الأشياء والبيانات الضخمة على نطاق أصغر. نفذ البحث نهجًا شاملاً قد يساعد في اعتماد تقنيات التحول الرقمي في صناعة الاجتماعات والحوافز والمؤتمرات والمعارض، بما في ذلك التدريب وتطوير البنية التحتية وبناء الوعي والدعم الحكومي.

الكلمات المفتاحية: التحول الرقمي، التكنولوجيا، صناعة الاجتماعات-الحوافز-المؤتمرات والمعارض، مصر.