

THE IMPACT OF ONGOING TECHNOLOGICAL CHANGES ON KEY ASPECTS OF THEATRE MANAGEMENT – THE DIRECTOR'S PERSPECTIVE

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Purpose: The purpose of the survey is to determine how theatre directors' perceive the impact of ongoing technological change on key aspects of theatre management.

Design/methodology/approach: The study adopted a qualitative perspective. Empirical data was obtained through interviews with theatre directors. The interviews were in-depth, partly standardised and unstructured. The research sample included theatre directors from different countries.

Findings: The research identified aspects of theatre management that are particularly susceptible to the dynamic development of next-generation technology. The theatre managers most frequently perceive the impact of technology in relation to: the meaning and function of the theatre; funding of theatre operations; stakeholder relations; maintaining audience relations; aspects of the production of theatre productions; and staffing policy and the functioning of theatre companies. Strongly negative perceptions of the impact of technology are held by theatre directors on, among other things, the functions and relevance of the theatre, the impact of cultural policy, and the autonomy of arts. In contrast, positive perceptions of the impact of technology mainly related to aspects of the production of theatre performances.

Research limitations/implications: The research is primarily limited to theatre directors' perspectives and the purposive nature of the sample cautions against broad claims about the entire population. Moreover, private and not-for-profit theatres are underrepresented. However, these findings could serve as a foundation for quantitative research aiming to generalize and explore new technology implementation processes in theatres. Further research into the implementation of artificial intelligence, perceived as a threat to the arts and theatre companies, seems crucial.

Practical implications: The results of the research can be taken into account by theatre directors as they implement next-generation technologies.

Originality/value: To the best of the author's knowledge, this article presents the first research on theatre managers' perceptions of ongoing technological changes in key management areas grounded in literature. The study's international scope enhances its value. The findings could benefit theatre directors, cultural organizers, researchers in theatre and cultural management, third-sector organizations in the theatre industry, and developers of new cultural technologies.

Keywords: Theatre management, arts management, technology, theatre director, artificial intelligence.

Category of the paper: Research paper.

1. Introduction

This article focuses on theatre management in the context of ongoing technological change. While the literature provides studies on the narrow area of theatre management (Ćwikła, 2012; Pawlicka, 2020; Waszkiel, 2016) and its coexistence with new technologies (Tabak, 2020), there are few studies that link these issues in a comprehensive way (Modliński, Moreira Pinto, 2020). Therefore, the author of this article sets out to determine how theatre managers perceive the impact of ongoing technological change on key aspects of theatre management.

Addressing this issue seems particularly important given the experience of the Covid-19 pandemic (Babicka, Czarnota-Misztal, 2021; Kieliszewski, 2021) and the demands that next-generation technologies will place on organisations that choose to implement them. The Covid-19 pandemic provided a strong impulse for adaptation across the cultural sector (Buchner et al., 2021; Raimo, De Turi, Ricciardelli, Vitolla, 2022), including artistic institutions. The process of adaptation initiated in many cultural organisations at that time has not been completed yet, has been halted or abandoned altogether, indicating the negative effects of these changes. Meanwhile, the cultural sector, and therefore the theatre industry, is facing another technological revolution, linked to the development of artificial intelligence, computer vision technology, augmented reality, the Internet of Things, etc., among others. This creates a need for research that is useful, particularly for theatre managers and organisers, to enable theatres to avoid the problems and mistakes of the pandemic period and to implement new technologies more effectively. This is particularly important given the perception that cultural sector organisations in general are slow to adapt to a changing environment (Lehman, 2009).

The list of key aspects of theatre management used in this article includes: the functions and meaning of the theatre; the influence of cultural policy; the autonomy of art; theater organizational form; financing the theatres' activities; evaluation of performance and efficiency of theaters; uncertainty and risk management; relations with stakeholders; maintaining relations with the organizer; maintaining a relationship with the audience; the dichotomy of artistic and economic goals; aspects of production of theatrical performances; personnel policy and the functioning of theater groups; leadership; managerial duos; the image of the organisation and the theatre director (Jabłoński, Karcz, 2024). This set is the result of a systematic literature review, which is a separate study. The catalogue presented is certainly not complete, but it is the author's intention to base her own analyses on a theoretical framework anchored in the literature derived from management and related sciences.

2. Contemporary theatre facing technological progress

The functioning of theatre institutions is inextricably linked to technological developments. Classical theatre technology (Gumiński, 2008) consists of stage mechanisms and technologies (e.g. curtains, trap rooms, drives), booths (e.g. sound, lighting), acoustic technologies, optical and lighting technologies, stage machinery and platforms, generators (e.g. smoke), etc. There are also technologies and techniques that are specific to a particular form of theatre. Examples include shadow stages, moving screens, panel screens, shadow masks, mechanised shadow models designed for use in shadow theatre (Kiszko-Dojlidko, 2023). Much of the traditional technology has seen its digital counterparts, for example in lighting control and sound production (Karcz-Ryndak, 2024). Theatres, like other organisations, commonly use IT systems (e.g. to support administrative processes) as well as communication technologies.

Today, the technological dimension of theatre operations is largely seen through the adaptations of the entire sector to the demands of the Covid-19 pandemic situation, as a result of which the way in which theatres communicate and interact with their audiences has changed dramatically in a short period of time. This has necessitated a number of fundamental changes in the core activities of theatres (Kalinowska, Kulakowska, 2021; Płoski, 2021) (e.g. in the form of online production of performances), intensified marketing activities in social media (Grząba, 2022; Żubryk, 2021), building and maintaining relationships with audiences (Michalak-Pawłowska, Plebańczyk, 2021).

Another challenge for theatre managers is the development of next-generation technologies, which are finding an increasing range of applications. Particularly noteworthy in this regard are sensor-based solutions, robotics (Knight, 2011; Nishiguci et al., 2017; Sovhyra, 2021), holographic techniques, gamification, VR (virtual reality) (Tabak, 2020) and AR (augmented reality) technologies, 3D digital technologies, AI (artificial intelligence) (Pizzo, 2019, 2021, Damiano et al., 2019), the Internet of Things (Modliński, 2019; Befera, Bioglio, 2022, p. 42).

From the perspective of stage use, artificial intelligence and AI-enhanced robotics, which give robots a degree of autonomy, seem to be the most controversial. In the case of theatre's relationship with AI, the literature provides information on, among other things: the contextualisation of AI in multimedia performance (Monteverdi, 2020); data sets used in the training process of neural networks (Befera, Bioglio, 2022); Expressive AI (Mateas, Stern, 2007); real-time interaction of algorithms on stage (Pearlman, 2020, p. 56); audience interaction (Rokeby, 2019); artificial intelligence as a digital agent (Agerfalk, 2020). Examples of specific AI implementations in theatre include: the play 'Chat GPT: The Mad World of Artificial Intelligence', where the Chat GPT language model was used to create the script (Adria-Art.co.uk, 2024); the use of sorting algorithms in the play 'Turbo Pascal Algorithmen' (Otto, 2019, p. 125); Annie Dorsen's AI-based algorithmic theatre (2012); 'Frankenstein AI: A Monster Made by Many', which used a machine learning algorithm with an ensemble model

to co-create a performance with the audience (Ginsberg, 2018); the use of facial recognition systems in the play 'Sight Machine' (Paglen, 2020); the use of AI tools to create promotional posters for the play 'Hamlet' by the Polish Theatre in Bydgoszcz (Dolecka, 2024); the Broadw.ai app, which uses AI to optimise the ticket purchase process (Broadw.ai, 2024).

In the field of robotics, on the other hand, researchers focus on, among other things, robotic mechanisms (Sone, 2012), the autonomy of robots in stage space (Knight, 2011), and their perception by audiences and theatre workers (MacDorman, Chattopadhyay, 2016; Mori, 2012; Rond et al., 2019). Examples of the use of robotics in theatre include: the roboticisation of choreography and music (Sagasti, 2019), including the use of soundbots (robots that are remote-controlled musical instruments); the use of robots to create imagery during a performance (Colton, Wiggins, 2012); a robotic actor using sensors and animatronics to scan people's body language and emotional state (Sovhyra, 2021, p. 298) and interact with the stage environment (Paré, 2015). The indicated applications of robotics become even more important in the context of the possible integration of these solutions with artificial intelligence, giving them increasing autonomy.

The presented examples of robotics and artificial intelligence applications confirm the validity of the division of the new generation of technologies used in theatres into complementary and substitutive (Modlinski, Moreira Pinto, 2020). The role of complementary technologies is to support human activities, e.g. by reducing human workload or speeding up the creative process. Replacement technologies, on the other hand, are intended to completely replace humans (Daugherty, Wilson, 2018). The second type of technology is particularly relevant in the context of the development of autonomous processes associated with the use of artificial intelligence. Modlinski and Moreira Pinto (2020), in a study that included theatres, showed that: augmentative technologies used for management purposes focus on data collection and rearranging the offer; augmentative technologies related to the mission of the cultural organisation are concerned with arousing emotions, developing imagination and increasing visitor knowledge; augmentative technologies related to management purposes are used for environmental analysis and control and office automation; augmentative technologies related to the mission of the organisation are used in the context of customer education, heritage preservation and cultural creation through the replacement of artists.

3. Methods

The empirical material presented in this article has been collected as part of a larger research project, entitled "Managing contemporary theatre in an environment of progressive technological change with an international perspective". The project was carried out by the author at the Cracow University of Economics. The research was conducted using a qualitative

approach (Cassell, Cunliffe, Grandy, 2017; Eriksson, Kovalainen, 2015; Jemielniak, 2012; Maison, 2022). The justification for adopting this research perspective is twofold. Firstly, the theatre itself, as an object of research within the management sciences, is still an insufficiently explored field of research. The gap becomes even more apparent if the technological theme of the functioning of these organisations is taken into account. Secondly, as can be seen from the literature (Karna, 2008) and the author's experience to date, access to a research sample is difficult. One of the reasons encountered by the author of this article in her research practice is the political nature of the function performed by theatre managers, which is susceptible to public opinion evaluation processes. In the author's view, adopting a qualitative approach based on direct interaction with the theatre community increases the chances of accessing the research sample and provides an opportunity to capture themes that might be missed in a quantitative study due to the relatively small number of studies on theatre management.

The research sample was purposively selected based on knowledge of the theatre industry. Two main benefits were achieved with this approach. Firstly, the time taken to recruit survey participants was shortened by reducing the administrative path to a minimum, which was particularly important in the case of public theatre managers. Secondly, the cost of the survey was significantly reduced. A total of 11 theatre directors were included in the study, including 7 from Poland and 4 from foreign theatres. The selection of participants in the study was guided by diversity criteria with regard to the organisational form and size of the theatres they manage. The presence of foreign theatre directors in the study group provides an opportunity to adopt a broader perspective that takes into account local factors in each country.

The empirical material used in this article was obtained through a qualitative interview method (Fontana, Frey, 2009; Kvale, 2023). The interview variant used can be described as semi-standardised and unstructured (Gudkova, 2012, pp. 113-115). Prior to the interviews, a list of information sought was drawn up, but the possibility was left to deepen emerging themes through additional questions.

The interviews were recorded and subsequently transcribed. In the subsequent stages, the interviews were anonymised, their content coded and analysed. The final stage was the validation of the results obtained. The coding employed can be described as open-ended, and a list of codes was created according to the snowball rule. The final set of codes corresponds to the aspects of theatre management cited in this article, with an indication of how theatre managers perceive the issue (positive, negative, or both positive and negative). It is important to note that the codes that emerged are a component of a larger coding structure concerning the previously mentioned research project, "Managing contemporary theatre in an environment of progressive technological change with an international perspective".

During the process of collecting empirical data and analysing it, specialised computer software, MAXQDA, was used.

4. Results

Theatre directors' perceptions of the impact of technology on specific aspects of theatre management are presented in Table 1. It contains the results of the analysis of qualitative interviews with 11 theatre directors. The labels D1 to D7 refer to Polish theatre directors and D8 to D11 refer to theatre directors from other countries. In the table, colours are used to indicate perceptions of technology in relation to specific aspects of theatre management.

Table 1.

Table title (left aligned, TNR 12 pt. font, italicized, single line spacing)

Key aspects of theatre management	Theatre Director										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11
The functions and meaning of the theatre	x	x	x	x	x	x		x	x	x	x
The influence of cultural policy			x			x	x	x			
The autonomy of art	x					x		x		x	x
Theater organizational form											
Financing the theatres' activities	x	x	x	x		x	x	x	x	x	
Evaluation of performance and efficiency of theaters		x					x			x	x
Uncertainty and risk management	x						x	x			x
Relations with stakeholders	x		x	x	x		x		x	x	
Maintaining relations with the organizer								x			x
Maintaining a relationship with the audience	x	x		x	x		x	x	x	x	x
The dichotomy of artistic and economic goals	x						x		x		
Aspects of production of theatrical performances	x	x	x	x	x	x	x	x	x	x	x
Personnel policy and the functioning of theater groups	x	x	x		x		x	x	x		x
Leadership											
Managerial duos									x		
The image of the organisation and the theatre director		x				x					x

x	Positive perception of technology's impact on theatre management
x	Negative perception of technology's impact on theatre management
x	Both positive and negative perception of technology's impact on theatre management

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

What is surprising is the lack of commentary on the organisational form of theatre and leadership. While in the first case this can be explained by the traditional perception of the organisational form through the prism of the form of ownership, in the case of leadership this situation is difficult to explain, if only from the point of view of the development of new forms of communication. A possible justification could be the issue of reluctance to recognise leadership, which is well known in the literature (Goodwin, 2020, p. 13). Furthermore, there

are themes among the directors surveyed that negate the formation of leadership relationships using technology (Table 2).

Table 2.

The impact of technology on leadership - theatre directors' views

Director	Opinion
D6	„(...) ja postrzegam przywództwo w kategoriach relacji z zespołem. Cyfrowa forma tej relacji jest mało użyteczna. Jak w taki sposób budować więź?”

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

The theatre managers surveyed have an overwhelmingly negative perception of the impact of new technologies on the functions and significance of the theatre (Table 3). The main concern is the loss of traditional theatre functions. According to respondents, theatre can be negatively affected by the massification of art and its commercialisation (Eikhof, Haunschild, 2007), which in the long term will lead to a decline in the artistic level and social impact of theatre. Indeed, theatre projects are spaces where identity co-creation takes place (Milne, 2003). There is also a theme of removing the human factor from the creative process. In contrast to these arguments, Director D4 sees technology as an opportunity to create new functions for the theatre - technology as a bridge between tradition and modernity.

Table 3.

The impact of technology on the functions and meaning of the theatre - theatre directors' views

Director	Opinion
D2	„You have to ask the fundamental question: what is theatre supposed to be? If we exaggerate technology (...), i.e. if there is too much of it in the play, is it still theatre or not? I think the fascination with this latest technological trend is a negative phenomenon from the point of view of the theatre's function. Although I don't like the term, theatre is predisposed to the propagation of high art, not cheap entertainment saturated with technology”.
D4	„The use of technologies (...) those digital, can create new functions for the theatre. For example, there is a lot of talk about combining tradition and modernity - theatre has been trying to combine these aspects for a long time. It seems to me that new technologies can be an excellent bridge between these worlds. Personally, I am in favour of these changes”.
D6	„Theatre has always been soaked with technology, but it has generally not affected the creative framework so much (...) for that there is an actor, there is a space between the actor and the audience and many other components. There has always been a human being behind traditional theatre technology. The new generation of technology is beginning to create itself. To create a script, you don't need an experienced screenwriter, you don't need the work that inspired him. All you need is a computer program. This is a great temptation, but it can be treacherous. It can cause the theatre to lose its original functions. For if the writer, the director and, ultimately, the actor play a secondary role in the creative process, one can ask whether the audience is being replaced by algorithms that have perfectly learned the behaviour of the audience”.
D11	"In my opinion, theatre is a "living art", there is no place for artificial intelligence (where the very name indicates artificiality) (...) theatre is created by people in a real place (not necessarily a theatre building), not in virtual reality (whatever that means) (...). If we accept such a hypocrisy of reality - theatre will lose its original function".

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

Some respondents perceive a possible impact of developing technologies on cultural policy (Vojtíšková, Lorencová, 2015). Interestingly, this area is perceived only in a negative way (Table 4). The main theme that emerges in the interviews is the legal risk of implementing the chosen solutions due to a lack of regulation. It may be that theatres will invest resources in technologies whose use will be restricted by cultural regulation. For example, Director D8 expresses such concerns in relation to artificial intelligence. These concerns may be justified in view of the controversy that this technology raises in terms of its use in the creative process or the unclear copyright situation. The second concern raised by respondents regarding the negative impact of technology on cultural policy is the issue of control and censorship. Respondents see technology as a tool that, over time, can be used to control the activities of theatres and, in extreme cases, even censor content despite its previous implementation for another purpose, such as increasing the availability of cultural goods.

Table 4.

The impact of technology on the influence of cultural policy - theatre directors' views

Director	Opinion
D8	„Unfortunately, I am afraid that all our attempts to introduce new technologies into the operation of our theatre will be blocked from above (...). For example, the use of artificial intelligence is not regulated by law. Sooner or later, such regulations will find their way into cultural legislation. Not always (...) and not to the same extent, the standardisation of conditions for the introduction of certain solutions will work in the same way in every institution, which unfortunately can cause pathologies. I would not like to invest in something, develop it and spend time on it, only to find out later that such a solution is unfortunately not in line with some regulation”.
D3	„Cultural policy is moving in the direction of greater accessibility, which in my opinion is not necessarily beneficial for theatres. Technology offers more and more possibilities in this respect, but theatres are often ill-prepared to use them (...), but that's not the problem ma'am. It seems to me that, from a technical point of view, the same technologies that can be used to increase accessibility can later be used to control theatres and even, which is hard to imagine for me, to censor inconvenient content”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

The negative perception of the impact of technology on aspects of theatre management also relates to the autonomy of the arts. This issue is indirectly linked to cultural policy. From the quoted statements, summarised in Table 5, it is clear that the increased possibilities for control associated with technological developments can lead to a reduction in the autonomy of theatres in terms of artistic activities. The phenomenon of reducing the autonomy of theatres through the proliferation of control mechanisms is well documented in the literature. A study of Norwegian theatres (Røyseng et al., 2020) provides an example. Interestingly, the reduction of autonomy in the theatres included in this study correlated with an adaptation to mass audiences and a reduction in the artistic level of the theatre.

Table 5.*The impact of technology on the autonomy of art - theatre directors' views*

Director	Opinion
D1	„New technology in the creative process means potentially higher costs for performances. It is hard to imagine a drastic increase in theatres' expenditure at this stage, so in many situations one can expect resistance from regulators. These expectations will to some extent affect the autonomy of theatres”.
D10	„In my country, a greater degree of control and parameterisation of theatrical activity is being sought. The new possibilities of control created by today's developing technologies, with artificial intelligence at the forefront, can be used to abuse and influence the theatre's autonomy in artistic matters, (...) essentially limiting it”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

When it comes to funding theatre operations, there is more variation in the opinions of the directors surveyed (Table 6). Positive perceptions of technology are generally linked to three issues. First, new technology can provide an opportunity to increase ticket revenues, particularly by broadening the range of offerings and attracting younger audiences. Second, the use of new technology can lead to savings by automating some tasks or replacing analogue solutions with digital equivalents. Thirdly, it is possible to use new technologies to optimise selected processes, such as marketing, and to improve the financial management process itself. According to respondents, the additional funds raised in this way will not fundamentally change the finances of theatres, but can provide significant support, which in many cases can be a recipe for financial shortfalls (Bukvic et al., 2016) and to some extent balance the dichotomy between artistic and economic goals (Bennett, 2009; Røyseng, 2008). On the other hand, respondents point to the potential loss of revenue from traditional audiences who may have different expectations of the use of technology in performances, so diversifying repertoire offerings is important. In addition, directors point to the capital-intensive nature of investing in today's evolving technologies. For example, the cost of entry into stage robotics is estimated at \$80,000 for the purchase of a single robot (Sovhyra, 2021, p. 301). For this reason, the implementation processes for many solutions should be considered over the long term. In addition, the directors surveyed suggest that the adaptation of technology in theatres will require increased subsidies from public funds.

Table 6.*The impact of technology on financing the theatres' activities - theatre directors' views*

Director	Opinion
D7	„Technology should also be considered from a financial perspective. I see performances that make extensive use of technology as an opportunity to improve budgets. It is clear that shows using VR technology, for example, attract younger audiences who prefer the cinema to the theatre, where no one is afraid of new technologies. Imagine a show in 5D technology, like in the cinema (...). At the same time, as a theatre manager, I also have to take into account the traditional audience, whose expectations are very different, so the most important thing seems to be to diversify the offer in order to maximise the income from tickets”.

Cont. table 6.

D9	„As I said, our theatre is not afraid of new technology and tries to use it. However, there is the other side of the coin - the cost. A modern director who wants to keep up with technological progress (...) must be aware that the process is capital-intensive and must be planned for years”.
D5	„Ma'am! Everyone was expected to make crores from online performances. And where is the money? Technology isn't going to save theatres' finances (...) it can, admittedly, be an aid in financial management, e.g. in controlling expenditure (...) but that's just cosmetics, powdering over the problem. This technological boom of our time in theatres will probably make a big difference to the industry's finances, but without additional audiences or increased subsidies, nothing will change”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

Directly related to funding is the issue of evaluating the productivity and efficiency of theatres (Alcouffe et al., 2019; Bennett, 2009; Velli, Sirakoulis, 2018). Some of the directors interviewed perceive the impact of technology on this aspect in a negative way (Table 7). According to the respondents, the use of technology to measure performance and efficiency can be associated with a lack of individualisation of evaluation, an overabundance of controls, biased methods of assessing artistic level, the need for theatres to fit into algorithms at the expense of the level of theatrical production. Positive feedback in relation to the assessment of theatre performance and efficiency relates mainly to the possibility of using technology to improve theatre performance through process optimisation, particularly in relation to administrative processes and expenditure control. Director D7 points to the possibility of using dedicated systems that can be adapted from business practice.

Table 7.

The impact of technology on evaluation of performance and efficiency of theaters - theatre directors' views

Director	Opinion
D10	„I can already see new ideas on how to use the advances of modern technology to measure the performance of theatres. Instead of focusing on the art (...) we will have to fit into algorithms designed for the whole industry, whereas each theatre is a completely separate entity”.
D11	„I am afraid of the new indicators created by technology, especially those concerning the artistic level. For so many years, no objective ways have been created to measure the artistic level of performances, and this time it will not work. Digital technologies have opened up countless possibilities for theatre regulators to control theatre activity. The question is, how far will this go, and will it not be to the detriment of the arts?”
D7	„I am very positive about the ever-increasing possibilities of using technology to improve the efficiency of my theatre. You know (...) I come from a business background. As a theatre manager, I have a duty to optimise processes and make them more efficient. I see the new metrics primarily as a way to improve administrative processes and control expenses. I have seen one-click systems in business and would like to see a similar system for theatres. One click and I have, for example, the whole budget in front of me with simulations of different variants for a given project”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

The contents of the interviews indicate both positive and negative attitudes of theatre managers regarding the impact of technology on the uncertainty and risk management aspect (Kleppe, 2018). Statements in this regard are presented in Table 8. On the one hand, technology

is seen as an opportunity to reduce risks and sources of uncertainty by implementing technology in areas where it is more reliable than humans. An interesting example of risk reduction is the use of algorithms to monitor audience satisfaction and expectations. On the other hand, technology is perceived as unpredictable and potentially failing by which it can be an additional source of uncertainty. A possible failure in stage conditions could cause image problems for the theatre (Dempster, 2006). Furthermore, Director D8 perceives the risk of becoming too dependent on technology. In view of this, respondents perceive the need to develop mechanisms to oversee the technology and an emergency response strategy.

Table 8.

The impact of technology on uncertainty and risk management - theatre directors' views

Director	Opinion
D8	„Risk management for new technologies is a very complex issue. Take, for example, modern algorithms that could be used to optimise selected processes in terms of management or performance promotion (...). One could even think about making selected processes autonomous. A successful intervention of this kind should help to reduce risks, but if faulty systems are implemented or these systems fail, the negative consequences for the theatre are difficult to foresee. The same is true at the artistic level. The use of technology can be something that makes a show stand out, that attracts audiences, but if such a show turns out to be a flop, it can be a source of image problems (...). I could also see the use of new technologies to monitor audience satisfaction and expectations. In this case, technology could be a risk mitigation tool. However, even here the issue is not clear (...) because the question arises as to the effectiveness of these analyses and the possibility of becoming too dependent on them, whereas it is the artistic risks taken on stage that allow theatres to move forward (...) and develop”.
D11	„I was once at a play that made extensive use of cameras set up in various parts of the dressing room, etc. The images from these cameras were projected onto a screen behind the stage where the main action was still taking place. At one point, one of the cameras began to show a technical fault. This was not intentional and this broken camera spoiled the whole message and distracted the audience (...), a while later some of the audience left annoyed by this situation. I thought the idea was very interesting, but I would like to point out that technology can fail when you least expect it”.
D1	„There are areas where technology is better than humans, and I would use it there (...). The problem with the latest technological developments, such as artificial intelligence, is that their behaviour is unpredictable. It is imperative to develop human control mechanisms and strategies to deal with crisis situations. Consider a problem like this. When an actor forgets part of a line, he or she has usually developed patterns of behaviour that the audience does not even notice. What happens when the algorithm crashes?”

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

In the context of stakeholder relations (Beirne, Knight, 2002; Rubio Aróstegui, Rius-Ulldemolins, 2022; Velli, Sirakoulis, 2018), the directors interviewed (Table 9) recognise its role in improving communication and in capturing audience data that may be attractive to sponsors. Furthermore, they point to the usefulness of the technology in terms of building databases and algorithms for selecting potential sponsors. At the same time, respondents point to the negative aspects of digital communication, such as the shallowness of relationships with theatre stakeholders. Director D5 also points to the possibility of losing sponsors who perceive the technological transformation of theatres negatively. Also important is the issue of stakeholders working within the theatre or its immediate environment, such as trade unions,

theatre associations or theatre advisory bodies. They can be a source of resistance to new technologies, as the example of the theatre council cited by Director D9 shows. The theatre organiser and the theatre audience are a special type of stakeholder and therefore require a separate analysis.

Table 9.

The impact of technology on relations with stakeholders - theatre directors' views

Director	Opinion
D4	„Different groups of people, different organisations (...) business partners and collaborating theatres and other cultural institutions are connected to our theatre. The role of technology in shaping these relationships is primarily to improve communication between us. I also see potential in gathering data about our audiences' preferences, which can be particularly relevant to our potential sponsors”.
D5	„We are already starting to use technology that allow us to reach out to sponsors more effectively. We create databases and try to identify potential sponsors based on specific criteria. However, we try not to rely on technology in our dealings with them. In our industry, a lot is done behind the scenes. Digital communication channels could make relationships superficial (...). As an interesting aside, I will tell you that our most recent sponsor is a company that provides specialised services in the IT industry, but the main communication channels are more traditional (...). Another issue is the possibility of losing sponsors who are not in favour of technology interfering with the art itself (...), we don't have a problem with this, but I know of cases in the industry”.
D9	„We discussed with the Theatre Council some time ago the question of working with a director who had previously staged productions using VR technology. Unfortunately, this was met with strong opposition from members of the Council”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

When it comes to the impact of technology on maintaining a relationship with an organiser, only foreign theatre directors mentioned this area. Interestingly, they see technology as a potential source of conflict (Table 10). In particular, the issue of organisers blocking the use of technology due to high costs is raised. In addition, the issue of new control tools, which, according to Director D8, will focus on costs and not on the results of the stage activities, comes up again.

Table 10.

The impact of technology on maintaining relations with the organizer - theatre directors' views

Director	Opinion
D8	„It seems that the main role of new technologies in the relationship with the organiser is to improve communication, but I see this mainly as a possible source of conflict. Firstly, the cost (...), as I mentioned earlier today, technology costs money and the funding is mainly the role of the organiser (...). Secondly, these are new tools to control theatres, especially their costs. Do you see where I am going with this? Once again there will be a discussion about money and no one will talk about art, which is our primary objective”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

In the context of maintaining relationships with audiences, the directors surveyed (Table 11) see next-generation technologies as a useful marketing tool as well as a platform for engagement. Respondents also see opportunities for algorithms to support dynamic ticket

pricing (Labaronne, Slembeck, 2015) and bundling (Baldin, 2017). In addition, technology can make a difference in building relationships with audiences by personalising content and providing pre- and post-performance incentives. This can be seen as a new perspective on the construction of an aesthetic contract with the audience (Anderton, Pick, 1996). Directors see this as an opportunity, particularly in relation to the younger part of the audience. The negative perception of the impact of technology on this aspect, on the other hand, is mainly related to the preferences of existing, repeat theatre audiences who are attached to a particular form of theatre and for whom theatre is more than just a place to see a performance. Technological innovation, especially the use of technology directly on stage, may be the cause of a migration of traditional audiences. With this in mind, respondents suggest being very cautious and introducing technology gradually to maintain a balance with the existing performance elements.

Table 11.

The impact of technology on maintaining a relationship with the audience - theatre directors' views

Director	Opinion
D4	„What is clear is the importance of new technology in terms of researching audience preferences and using online platforms to promote events and connect with audiences. I can also see the usefulness of technology in the context of sales, e.g. through better tailored offers or flexible ways of pricing. However, I think the key is to use technology to create excitement before the performance and to extend those experiences after the performance (...). I think personalisation of content can be important here. Imagine exclusive content available only to viewers just before or just after the show and personalised to the individual viewer (...), such as the ability to replay certain scenes from the show based on the viewer's commentary”.
D6	„(...) but I wouldn't expect a revolution. The spectator who comes to us is a repeat spectator. A spectator who has a kind of ritual of coming. And what happens if we disturb this ritual too much? Does the spectator prefer to be greeted by an actor from our theatre who can talk to him, tell him about the performance, or does he prefer digital exposure?”
D1	„In our theatre, we are very interested in these innovations that allow us to deepen our relationship with the audience. But we must be careful not to use these tools mechanically. A real relationship has to be built on stage, and the conscious use of technology can be a way of consolidation it”.
D5	„If we want to move forward and develop the arts, we must try to adapt our proposals to young people. However, it would be worth remembering not to expose ourselves to ridicule and not to create Ursula Kochanowska by force as a child glued to her smartphone (...)”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

Some of the directors interviewed noted the possible link between technology and the phenomenon of the dichotomy of artistic and economic goals in theatres (Table 12). They see the possibility of an increase in the cost of theatrical productions due to the increased possibilities of stage productions and the high cost of entry. On the other hand, technology may be associated with additional revenues, e.g. by attracting new audiences. There is also the possibility of the commercialisation of the arts and the lowering of artistic standards, as has been raised in other areas. Ultimately, whatever the direction of these changes, there will be a deepening dilemma for theatre managers as they seek ways to balance artistic goals with the economic dimension of running a theatre (Bennett, 2009).

Table 12.

The impact of technology on the dichotomy of artistic and economic goals - theatre directors' views

Director	Opinion
D1	„We should remember (...) that technology is also a cost. If you don't look at the business side of the show, you can do anything the artist wants. However budgets are not made of rubber. Most of these new technologies are difficult to access and expensive, so I think that at this stage theatres that decide to adapt technology for the stage will have to pay a lot more”.
D7	„On the one hand, the introduction of new technologies to the stage offers new creative possibilities. Concepts that have remained on paper until now can be realised. On the other hand, I am also responsible for the finances of my theatre. There are already cases where we have had to abandon some artistic goals because there is not enough money (...). Expensive technology certainly doesn't make these decisions any easier”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

Respondents mostly recognised the impact of technology on aspects of theatre production (St. James, Colbert, 2011). The statements compiled in Table 13 point to the possibilities of using new technologies on stage, either as a technical support for artistic intentions (e.g. voice tone modulation using a dedicated app) or as a form of performance reception (e.g. using VR technology). The involvement of artificial intelligence in the creative process at the script-writing stage is controversial. In addition, the directors surveyed perceive a danger in creating a play under the existing technology. Technology adds a further level of complexity to the management of theatre production, so respondents point to the need to develop mechanisms for effective technology selection in specific stage applications.

Table 13.

The impact of technology on aspects of production of theatrical performances - theatre directors' views

Director	Opinion
D5	„It all depends on how we use new technologies and what we want them to help. Wise use of assistance is always welcome. But it is important that we do not get carried away and place too much responsibility for the whole performance on the creations of so-called artificial intelligence. Because if it fails ... then the whole show goes down in flames”.
D4	„The stage (...) is where new technologies mix things up. We try to take advantage of the opportunities that arise. We were one of the first theatres in our country to introduce digital elements. We've been testing VR technology - it looks promising”.
D6	„Have you seen these shows written by artificial intelligence? Have you heard of them? This is no longer theatre. Technology yes, but at the service of the actor and director on stage, not against them”.
D2	„Stage management can focus on the overgrowth of novelties rather than on the substance of the matter, i.e. the art. There is also a risk that the director will try to use techniques where they do not make sense, just because he or she knows them (...)”.
D11	„For my part, I see many positive aspects of these modern technologies. It used to be that for the 'angel descending from heaven' we needed ropes and a lot of security and people to make sure nothing happened to the actor, and still the scene didn't look very natural for my taste. Now all we need is a mast on an actuator and programming it to lower at the right speed and at the right time. Similarly, we had a dilemma with changing the tone of an actor's voice - it took a lot of work, now all we need is an app. We look forward to new solutions that, often at little cost, can significantly improve some of the processes involved in creating performances”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

The potential impact of new technologies on the personnel policies and functioning of theatre groups is controversial. Respondents' statements on this issue are presented in Table 14. The majority of interviewed directors have a negative perception of this issue. Issues of staff opposition to new technologies used to automate human work and applied directly to the stage are reported. This may be directly related to the perception of these solutions from the perspective of substitute technologies replacing human labour. Directors also indicate that the use of complementary technologies to support human work does not necessarily lead to an increase in team efficiency. This may be due to the lack of digital and technological competences (Karcz-Ryndak, 2024; Korzeniowska, Ptaszek, 2021) of the employed staff or the habituation to the developed work patterns. A partial solution to this problem may be to employ specialists in the technologies used, but this is severely limited by the budgetary constraints of theatres. Another important factor is the possibility of weakening the bonds within the company in the long term and the impact on artistic identity and motivation (Eikhof, Haunschild, 2006; Lindgren, Packendorff, 2007). With this in mind, the role of the theatre director is to manage the relationship between personnel and technology in a way that leads to maximising the effects of this collaboration while minimising its negative effects on the ensemble.

Table 14.

The impact of technology on personnel policy and the functioning of theater groups - theatre directors' views

Director	Opinion
D3	„Our theatre company is made up of people of different ages. The younger ones should not have a problem, but there is a problem with the older ones. (...) This race against time is unbearable for them, they complain that they lose motivation, they begin to feel superfluous, whereas these are often the people for whom the crowds come to see us. I would like to stress that some people sometimes work more efficiently without "facilitators" such as new technologies (...).”
D7	„People will be against it (...), why should they learn something new, why undermine their work? In addition, people see automation of work mainly as redundancies. Such changes have to be made very gradually, or you will come into conflict with the employees. Given the size of my theatre, this is a big challenge (...).”
D5	„There's a lack of knowledge and the right people, and we're supposed to be making art, not programming. The pandemic showed what this looks like in practice - everyone had problems with digitisation (...) because there was a lack of competences, there were no people to do it”.
D10	„New technologies improve the efficiency of our team. The automation of certain processes, faster communication, new digital competences of our staff - all this allows us to devote more time to the main purpose of our business, which is art. But I wonder if, in the long term, we won't see some negative effects (...) I'm thinking, for example, of a weakening of the bonds within the team, which are very important in our business”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

Only one of the directors interviewed noticed the impact of technology on the functioning of management duos (Bhansing et al., 2012; Järvinen, Ansio, Houni, 2015, p. 25). This may be due to the fact that some of the respondents had never worked in such arrangements. Furthermore, it may be indirectly related to the lack of references to the impact of technology on leadership. Director D9 points to technology as a potential source of conflict between the managing director and the artistic director (Table 15). This perception is consistent with the

literature on dual leadership (Reid, Karambayya, 2009). In such arrangements, there is an encroachment on each other's competencies that leads to conflict. Technology can therefore be an additional source of contention when there are differing views on its implementation in theatres.

Table 15.

The impact of technology on managerial duos - theatre directors' views

Director	Opinion
D9	„I don't see it in this form of business, where we have a managing director and an artistic manager. Even without this modern technology, we have enough problems getting along on certain issues. You know what I mean (...) we don't get along with my artistic manager on these issues. He is against all these innovations of the last few years. You'd better not mention pandemic-era Internet performances or artificial intelligence in front of him. I, on the other hand, am in favour of experimentation, and so we have another area of conflict. Arguments (...) that this will open up new market opportunities and reach new audiences don't get through. So at the end of the day, artistically, as the name suggests, let's deal better with the artistic sphere, I'll try to find the money for it (...) and let's keep it that way”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

The last analysed aspect is the image of the theatre organisation and the director (Cray, Inglis, 2011, p. 100; Scapolan, Montanari, 2013; Voss, Cova, 2006). Respondents consider technology in this area to be an opportunity to improve the image of the theatre (Table 16). This can be done through the appropriate use of technology at every stage of contact with the audience, as well as through the use of innovative technologies directly in the performance, which will allow it to stand out from other theatres. However, this involves an artistic risk which, if it is not successful, will have a negative impact on the image of the theatre and the theatre director himself.

Table 16.

The impact of technology on the image of the organisation and the theatre director - theatre directors' views

Director	Opinion
D6	„When we decide to combine art and technology in a performance, we need to be sure that everything is finely tuned. Managing such an undertaking is not only a technical challenge, but above all an image challenge. You can win a lot, but you can also lose a lot. If something goes wrong, the media and theatre critics won't let us off the hook. On the other hand, the successful use of technology in a performance can help the theatre to stand out, to make its mark on the Polish and international stage”.
D3	„The theatre works on its image through everything it does. It's good to be distinctive, and we work hard at it. We attack the content of our audiences from the very first contact at the promotional stage. This is where new technologies come in handy. These tools for creating graphics or short films based on the content itself, or involving the audience in the creation process on social media, are all these little bricks that build the image (...). It's good how this interacts with the theatre manager when it reflects his artistic vision, because then it starts to feel authentic”.

Note. To ensure the anonymity of the theatre directors, they have been marked D1, D2, D3 etc.

Source: Own elaboration based on qualitative interviews with theatre directors.

5. Conclusion

Technological development also has an impact on theatre management. This is evidenced by the empirical material presented in this article. Theatre directors may perceive these effects differently. There are both staunch supporters and opponents of the use of technology, but for the most part the directors interviewed have a mixed attitude towards it.

Analysis of the research results has identified aspects of theatre management that are particularly susceptible to the dynamic development of new generation technologies. The study shows that the surveyed theatre directors most frequently perceive the impact of technology in the context of: the meaning and function of the theatre; the financing of theatre activities; stakeholder relations; maintaining audience relations; aspects of the production of theatre productions; and staffing policy and the functioning of theatre companies. On the one hand, theatre directors have a strongly negative perception of the impact of technology on the functions and significance of the theatre, the impact of cultural policy or the autonomy of the arts. On the other hand, they perceive the impact of technology on aspects of the production of theatre productions positively, especially as a tool to support the work of the theatre ensemble and as an addition to the artistic layer of productions.

In the context of comparisons between Polish and foreign theatre directors, the main theme that emerges is the connection between the autonomy of art, the assessment of the efficiency and effectiveness of theatres, and maintaining a relationship with the organiser. The directors of foreign theatres are clearly negative about the impact of technology on these areas. This may be related to the more developed control mechanisms of the theatre industry in the countries surveyed. In interviews, directors of these theatres pointed to a tendency over many years to formalise the operation of theatres. This can lead to excessive bureaucratisation, resulting in a proliferation of control mechanisms for theatres by their organisers and a consequent gradual reduction in their autonomy. Technological developments can help to accelerate these processes.

In assessing the impact of the research undertaken, it is important to highlight its contribution to both management theory and practice. In addressing theoretical issues, it has provided new insights into the relationship between management and technological developments in theatres. In the author's view, this is of particular value because of the direct confrontation of technology with key aspects of theatre management that are well established in the literature. The practical dimension of the research, on the other hand, is primarily concerned with its usefulness in the context of implementing new technology implementation processes. The knowledge provided can be useful to theatre managers, those in other management roles in theatres, theatre organisers, as well as developers of new technologies and digital solutions for culture with a particular focus on the theatre industry. In addition, the results of the research can be a reference point for researchers in theatre management and

cultural management, third sector organisations whose activities are related to the theatre industry, as well as cultural managers from other artistic fields.

It is also important to point out the existing limitations of the research conducted. Firstly, it only covers the perspective of theatre directors. Secondly, the purposeful selection of the research sample suggests caution in generalising the theses of this article to the population as a whole. Finally, the study gives little attention to private and non-profit theatres. It should also be noted that the list of aspects of theatre management included in the study is not closed. The author has only included issues that are well established in the literature as a result of a systematic literature review. The results of the research presented in the article can serve as a starting point for quantitative research in an attempt to generalise, as well as for research in the field of management of new technology implementation processes in theatres and other artistic institutions. Particularly important seems to be the further exploration of the thread related to the application of artificial intelligence, which is perceived as a threat to the arts, and in terms of substitute technology, as a threat to theatre ensembles.

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