# The Mediating Effect of Artificial Intelligence on the Relationship Between Cultural Heritage Preservation and Opera Music: A Case Study of Shanxi Opera

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## Abstracts

Cultural heritage preservation, as the approach is known, and the enduring role it plays in safeguarding the culture and cultural values of Shanxi Opera is becoming even more important these days. Despite uncertainty and apprehension about utilising artificial intelligence, this matter is worth scrutiny in relation to the field of opera music. This may be so, as apart from these two occurrences, this field does not receive mention. This research aims to explore the effect of AI as a conduit for message emulation between the Shanxi Opera tradition and the preservation of heritage and the opera music genre. The study employed a combination of qualitative and quantitative research methods, which used the survey data and cultural heritage preservation and opera music experts' perception data. I then employed partial least squares structural equation modelling (PLS-SEM) to interpret existing AI utilisation and to understand the role of AI as a mediator in this scenario. The outcome of the study implies that the existence of AI will not only boost the contribution of cultural heritage conservation but also positively impact the early stages of the contemporary revival of Shanxi Opera music. AI not only helps in heritage preservation but also makes it easier to include modern audiences. It introduces new musical trends and styles that are more engaging with the current audience. This paper lays out certain practical applications of artificial intelligence AI as a key to appreciating the human cultural heritage. It is the AI-driven contribution to opera music superiority that stands as the hallmark of technology. The outcomes showcase a one-of-a-kind perspective that indicates the ability of policymakers, cultural heritage preservers, and opera commuters to bridge the gap between traditional and modern technologies through AI. Research has stressed the essence of enlisting AI as a typical tool today to preserve cultural heritage. This, in turn, largely contributes to the development of dramatic genres such as opera. It serves as a rather remarkable point of interface between the cutting-edge realms of technology and cultural legacy, illustrating how AI can virtually reshape the artistic world.

**Keywords**: Preservation of cultural heritage, Artificial Intelligence Opera music, Shanxi Opera, Technology and Culture.

## Introduction

With special regard to similar production or artistic activity in the form of Shanxi Opera, the preservation of cultural heritage is fundamental to retaining our patrimonial and cultural interests. In the age of Artificial Intelligence (AI), the operation of this technology in cultural heritage maintenance is becoming more crucial. In arts, AI opens possibilities to introduce innovative strategies aimed at maintaining and regenerating ancestral cultural practices; however, its involvement in opera improvement and patrimony perpetuation is yet to be sufficiently studied. This study seeks to investigate how AI plays a mediating role in the cultural preservation effect on opera music quality and performance for Shanxi Opera by utilising a single-case research methodology. A complex issue of utmost importance is cultural heritage conservation, which mainly deals with the protection of material, intellect, and immaterial traditions. The opera of Shanxi is considered an appropriate research target, as it privileges a great history and symbolic meanings, which provide suitable data for the analysis. The old ways of conservation might be difficult and costly to do, and the largely preserved fragment of antique deepens and performs of opera can be forgotten. The practical application of AI entrusts its implementation to performing advanced machine learning techniques and fostering digital archiving, which leads to the development of another dimension where culture finds support in terms of growth and preservation (Hodonu-Wusu, 2024; Masenya, 2023).

Even with all the benefits, a research gap is evident, which concerns the role of AI as a mediator between cultural heritage preservation and opera music. The study seeks to lessen this gap by analysing how advanced technology can assist in the conservation of Shanxi Opera and will use creativity to improve its music. Artificial Intelligence is capable of processing vast amounts of long-past data, finding unconventional patterns, and offering new compositions and performances, all of which, like never before, result in the enrichment of the opera experience (Gardner, 2021; Shaw, 2022). A mixed-methods approach utilised in this work involves the analysis of both quantitative and qualitative elements. The conduct of the survey and interview with the questions of the cultural preservers, opera performers, and AI experts makes the foundation of the research data collection process. As the data is analysed by the partial least squares structural equation modelling (PLS-SEM) method, there are crucial insights and understanding into the mediation of AI (Al-Emran et al., 2023; Rafiq et al., 2022; Wong et al., 2024).

The outcomes of our research are projected to show the positive impact of AI applications on cultural heritage preservation, thus leading to the dominance of quality and quantity aspects of Shanxi Opera music performance. Through this symbiotic posture, AI ushers in novel ways of creating, staging, and participating in opera, thereby weaving digital technologies and floor traditions together (Eger, 2022). From a practical point of view, the research has an immediate implication for policymakers, cultural preservationists, and the opera community. It goes without saying that it not only examines how AI is used to preserve heritage but also aims to raise the quality of opera music. Moreover, the outcomes of the investigation demonstrate numerous opportunities that AI brings to changing cultural practices and ensuring cultural traditions' stability (Borsci et al., 2023; Dwivedi et al., 2021). The outcomes of this research result in the advancing of discussions around the link between cultural heritage protection in light of AI

contribution and opera music preservation. It indicates that AI could lead to a new realisation of art in the era of science and technology and unfolds an interesting centre of the debate about the role of technical innovation in art and cultural heritage. The implementation of AI technology in preserving Shanxi Opera would prove successful, creating a precedent for the rest of the world to take a cue from when implementing their cultural heritage preservation initiatives (Marquis & Qiao, 2022).

RQ1. How can the use of AI contribute to the maintenance of Shanxi Opera's cultural legacy?

RQ2. What will the influence of AI be in the process of cultural heritage maintenance on the quality of opera music?

RQ3. What can AI do to provide the audience with an unmatched experience and aid performers in showcasing their best abilities?

RQ4. What are the practical implications that arise due to the interaction of AI in the world of culture preservation for those in power and practitioners?

The importance of this research is phenomenological because it can not only expose the novel findings but, as a result, improve cultural heritage protection and opera music, leading to theoretical aspects thanks to AI.

## Literature review

2.1 Effect of Artificial Intelligence on Cultural Heritage Preservation and Opera Music

Artificial Intelligence (AI) has the potential to change not only the way sectors operate, as one Tecumseh Bryan emphasises, but also future systems, including cultural heritage preservation. AI, encompassing the skills, knowledge, sensitivity, understanding, experience, and values of the employees, can be a tool for fostering the preservation of cultural heritage (O'Neill & Stapleton, 2022; Spennemann, 2023). In the context of Shanxi Opera, AI can be described as the adoption of innovative technologies capable of maintaining and revitalising traditional cultural practices (Liao & Chonpairot, 2021). This involves practices such as digital archiving, machine learning for music composition, and virtual reality for immersive performances (Pistola et al., 2021). AI, by its nature, would have the capability to do what is done for cultural heritage through the incorporation of technology that matches the emphasis on productivity brought about by the advanced technological skill sets of AI (Anantrasirichai & Bull, 2022; Chowdhury et al., 2023). In a study by Nyamekye et al. (2024), it was found that the success of any novel way of doing things hinges on AI. AI improved the cultural preservation behaviour of technology firms in the research by Waseel et al. (2024) because it was positively and critically significant. Innovation capability is increased by AI Zong and Guan (2024), and in turn, innovation is a prerequisite for the introduction of advanced preservation. Therefore, the key enabler of product or process innovation is AI, which is an essential factor in cultural heritage conservation.

Further related investigations corroborate the evidence of the significant effect of AI on preservation activities. Another study looking at the same line concluded that AI offered the

chance to employ more advanced strategies, thus making it more effective in preservation. In that case, Al-Swidi et al. (2024) have the potential to increase the sensitivity and efficiency levels in the operations of the programs, which can, in turn, be an attractive factor for the development of innovative preservation methods. Artificial Intelligence invests in the company and helps the growth of the organisation Singh et al. (2023) while it brings the internal skills of adopting preservation practices. There was proof of the positive influence of AI on the adoption of preservation practices by López-Gamero et al. (2024). According to the study by Namagembe et al. (2016), the effect of AI-driven empowerment along the lines of innovative practices was noticeable in a number of sectors. As for the arts industry, AI input enhanced the perceptions and attitudes toward library collections (Harisanty et al., 2024; Tigre Moura et al., 2023). The author conducts a case study in the Malaysian hospitality industry and provides evidence that the usage of AI techniques contributes to the processes of cultural preservation, increasing their effectiveness (AlQershi et al., 2023). Companies that educate their employees by means of training and work orientation improve their qualifications, hence enable to apply cultural preservation manners (creativity and innovation) by enhancing perseverance. Given the preceding, the following hypothesis is stated:

H1: AI positively impacts the preservation of cultural heritage.

2.2 Mediating Effect of AI on the Relationship Between Cultural Heritage Preservation and,

The application of AI can be characterised as the combining of technological breakthroughs, which enables people to keep their cultural heritage. This course of practice is called joint and interactive sense-making between the employees of the unit (Ganon-Shilon & Schechter, 2021). With involvement in cutting-edge practices, the working atmosphere will be the prone field for workers to get interested in preservation endeavours, and, in the process, they will contribute to spreading and exchanging their know-how and competencies in cultural management through the use of innovative practices (Engelsberger et al., 2022). The management of new technology protects plants and their surroundings through the development of intelligent organisation. Singh and his fellow researchers proposed so in the article that workers' skills are married with technological advancements to gather the fruits of preservation procedures. Organisational climate stands as one of the means for engaging and channelling employee enthusiasm, which translates to organisational priorities, targets, and ambitions (Kamaraj, 2022). Consequently, it can be concluded that in a situation where the team members have the same belief that the company is very technologically innovative, they will complement and join one another in initiating innovative efforts for preservation (Vrontis et al., 2021). As far as the organisational side is concerned, the success of preservation largely depends on how the appropriate combination of personal and organisational factors is realised in the workplace during the actual acts of protection (Alghail et al., 2023). Employees' outcomes in terms of innovation through creativity and technology have a strong tie to safety practices, which leads to strong organisational performance in a commendable working climate (Gahan et al., 2021). Employees' development begins with the organisation creating a Digital Transformation that helps its line managers exhibit innovative behaviour, thereby enhancing involvement in the organisation's goals (Nicolás-Agustín et al., 2022). Moreover, AI is capable of helping in the development, retention, and encouragement of employees possessing conservation skills, and in

doing it is possible to set up a Digital Transformation in the organisation leading to a green innovation for the adoption of preservation practices(Feng et al., 2022).

So, from the results achieved, AI is having an indirect impact on the adoption of preservation practices due to the innovation fostered by AI. What is meant by the above point is that the intervening factor between AI and preservation practices is the innovative climate. The article, therefore, aims to lay the second of the following hypotheses:

H2: AI has an indirect effect on the adoption of preservation practices through the innovative climate.

## 2.3 Effect of AI-Enhanced Preservation Systems on the Quality of Opera Music

Opera music's standard is considered as the identification and assessment of any opera concert using different standards such as customer needs and psychological factors to be considered (Cancellieri et al., 2022; Tubillejas-Andrés et al., 2021). The topmost priority in terms of opera quality is the presentation of only high-quality performance acts, which is even more crucial in cases of subtleties such as traditional Shanxi Opera. However, the diversity of opinions on the positive application of preservation methods in relation to musical quality might also be a reason for this. Preservation efforts led to an increase in performance quality, demonstrated in the study of Esmaeilifar et al. (2022), thanks to the betterment of artists' work environment and fresh artistic issues' presentation. Accordingly, Baccarella et al. (2022) noticed that creative initiatives directly had a positive effect on work quality. Uplifts as such were justified by similar results that were reached by Della Porta (2023), who also declared that performers received satisfaction and morale owing to technological tools. Through consistently accepted connection values between "doing good" and "feeling good" with reference to emotional attitudes and social and moral behaviour (Unanue et al., 2021), it is argued that the conservation of resources and innovation behaviours could contribute to the pleasure of actors, by supporting them with fulfilling emotional need in the performance (Phuoc et al., 2022). While incorporating preservation practices, new ways of doing things will be put in place, and working in such processes will significantly influence the workers' job demands, leading to a high workload. As a result, they may become stressed Yet, the benefits an AI program can provide, like a decrease in work pressure and a better performance standard, are proven. The intensity of the job performance task and the state of believing that efficiency would be highly fined are the chief causes of tension (Landaeta Torres, 2022). At the same time, AZID (2022) states that work environment-related anxiety is a considerable aspect of discontentment. Prior results with regard to workload and frustration have proven to have a direct interplay in previous research (Troesch et al., 2023). Therefore, Hur et al. (2021) suggested the role of creativity in better-quality work. Overload is usually brought by the desire to achieve a lot, which might lead to a lower job satisfaction level. According to Hur et al. (2021), an increasing level of satisfaction is associated with stress reduction by employees. However, by practising conservation, the performers may not be really willing to complex themselves, which is likely to increase their job-relevant problems and lead to dissatisfaction (Stirpe et al., 2022). Despite previous studies describing different directions of preservation-quality relationships, most of them reflect and also argue that a higher probability of inventive practices impacts the quality of performance in practice well because of the quality. Accordingly, the next hypothesis is generated:

H3: In the case of the use of artificial intelligence in preserving processes, opera music quality is more likely to be at a better level.

## 2.4 Moderating Effect of a Digital Transformation on the Relationship Between Preservation Practices and the Quality of Opera Music

A moderator is a quantitative or qualitative variable that changes the direction or strength of the link between an independent variable and a dependent variable (Pesämaa et al., 2021). In this study, Digital Transformation is considered a moderator for the relationship between preservation practices and music quality due to inconsistent findings reported in previous studies. Innovation climate is a term that stands for the comprehension of the employees of the organisational policies, methods, and technology that are based on technological solutions, usually acquired through participatory sensemaking (Pesämaa et al., 2021). An investigation by Bratton and Paulet (2022) concluded that there was a surprising correlation between digital transformation and employee satisfaction. As one would expect, the relationship was found to be the greatest with regard to innovation levels. Scholars have commonly observed that working in a team increases people's job satisfaction (Wang et al., 2021). Consequently, when employees integrate into the company, their satisfaction is predicted to be an exceedingly high value. Additionally, organisations that have a well-thought-out innovation climate will help to match the job roles of employees so that they are performing their assignments with ease as required Kahura (2023), and hence their satisfaction Dasgupta (2021). Support of employees by way of an innovative organisational climate, integrating directly with the work they do, leads to job satisfaction in that manner (Yadav et al., 2022), which positively influences employees' happiness or satisfaction while at work.

Therefore, by facilitating an exact format of the innovation climate, an increase in satisfaction will occur from the implementation of conservation projects. A successive review of the research done by Hanelt et al. (2021) proved this result by breaking the ground on the fact of a significant relationship between the perception of Digital Transformation and job satisfaction. Technology has grown concern in the current time that people are in jobs which conform to their belief about technology. Thus, the bigger the role the pattern of technology has in the job, the more satisfaction the workers have. Consequently, companies can make employees happy when they are able to create a highly innovative environment, and users are taught how to adapt to those changed conditions where preservation practices are in place. So, on the basis mentioned above, the following hypothesis is formed:

H4: In such cases, the strengthening of the innovative environment leads to an even bigger impact of preservation practices on music quality.

The conceptual framework depicting configured ideas in the study is shown in Figure 1.
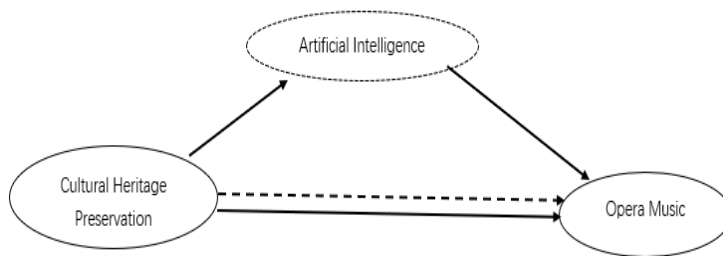
Figure 1. Theoretical framework showing the research's hypotheses

**Methodology**

This section spells out the research approach used in the study. It will also look into the sample size, nature of the study area, research context, procedures, data collection methods, and data analysis.

3.1 Research Approach, Sample, Context, and Procedures

  A deductive research approach was adopted since it provides a way to carry out studies with a clear conceptualisation of the concepts under investigation, a clear operationalisation of the concepts, a structured methodology used, and the construction and testing of theoretical frameworks (Rageth et al., 2021). This approach, at the same time, leads to the generalizability, reliability, and validity of the research (Hays & McKibben, 2021). Non-random sampling, or more particularly, convenience sampling, was utilised to select cultural preservationists and Shanxi opera performers alongside AI experts involved in saving and performing the opera of Shanxi. Convenience sampling was selected for use because it is more effective, considering the fact that a very short time is needed to recruit a huge number of respondents After all, it is very easy to access (Abdalla Hamza et al., 2021). Data collection was done through email and calls, and the research question was explained to the participants. The consent form was filled out, and a period of data collection occurred between June and October 2021, followed by reminders in some periods. The gamma exponential method established the sample size, indicating a power of 0.8 and a significant path coefficient of 0.197, thus suggesting a minimum of 146 (Alomari et al., 2022). Of the 308 available questionnaires, 83% were received, with 257 valid questionnaires, which readily give the response rate. The responses were divided between the work of cultural preservationists, opera performers, and AI experts.

3.2 Measurement of Constructs and Questionnaire Design

The study employs four constructs in its research framework that were measured using a questionnaire from previous studies. The questionnaire included these sections: demographic information, AI, CHP, OMQ, and DT. Specifically, the constructs, together with their sources, are given in Table 1. AI and DT were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).CHP and OMQ were measured using a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Items are formative, and thus, "general constructs"

would be gathered for the analysis of redundancy and convergent validity (Hair et al., 2020a). By being the construction tool of these Likert scales that showed evidence of common method bias, the randomisation method was applied (Kaltsonoudi et al., 2022). A pilot study was conducted testing the questionnaire for its reliability, and the composite reliability coefficients (AI = 0.83, DT = 0.77, CHP = 0.86, and OMQ = 0.91) were reported.

Table 1: Constructs and Indicators

| Constructs and Indicators | Sources |
| --- | --- |
| Artificial Intelligence (AI) | |
| AI enhances the preservation of cultural heritage (AI1) | Skublewska-Paszkowska et al. (2022) |
| AI improves the quality of opera music (AI2) | |
| AI facilitates innovative practices in cultural preservation (AI3) | |
| AI supports the digital archiving of cultural artefacts (AI4) | |
| AI enables new forms of artistic expression (AI5) | |
| Cultural Heritage Preservation (CHP) | Oppio and Dell'Ovo (2021) |
| My organisation actively preserves cultural heritage (CHP1) | |
| We use technology to maintain cultural artefacts (CHP2) | |
| Our preservation methods are innovative (CHP3) | |
| We have a strong commitment to cultural heritage (CHP4) | |
| Our preservation efforts are recognised (CHP5) | |
| Opera Music Quality (OMQ) | Williams and Monteleone (2021) |
| The quality of opera performances is high (OMQ1) | |
| We incorporate modern techniques in opera (OMQ2) | |
| Audiences are highly satisfied with our performances (OMQ3) | |
| We use AI to enhance opera music quality (OMQ4) | |
| Our opera music receives positive reviews (OMQ5) | |
| Digital Transformation (DT) | Zhu et al. (2021) |
| Our organisation embraces digital transformation (DT1) | |
| Employees are encouraged to use digital tools (DT2) | |
| We have a supportive environment for digital innovation (DT3) | |
| Digital transformation is part of our organisational strategy (DT4) | |
| We invest in new digital technologies (DT5) | |

## 3.3 Methods of Data Analysis

The data have been analysed through Partial Least Squares Structural Equation Modeling (PLS-SEM) using the WarpPLS version 8 software, which is suitable for confirming theoretical relationships, as well as handling different types of data distribution, specifically, asymmetrically distributed data (Myamba & Nguni, 2023). The factor-based PLS algorithm model was used to analyse the research, and the stable three was applied in measuring p-values (Memon et al., 2021). The structural part has been tracked using a Warp 3 model, which takes into account non-linearity (Deng & Ogilvie, 2022). Through the mediation analysis method of transmission in relation to focusing on an indirect effect, same-purpose organisations were focused on this method, such as that of Alzghoul et al. (2024) or Gui et al. (2022). The two-stage approach of the moderator's effect analysis is well suited to formative constructs (Becker et al., 2023).

Table 2: Convergent Validity and Indicator Loadings

| Constructs | Convergent validity | Weights | p-value | Indicator loading | VIF |
|---|---|---|---|---|---|
| Artificial Intelligence (AI) | 0.963 | | | | |
| AI1 | | 0.201 | 0.005 | 0.819 | 1.279 |
| AI2 | | 0.028 | 0.016 | 0.232 | 1.010 |
| AI3 | | 0.154 | 0.025 | 0.939 | 1.306 |
| AI4 | | 0.107 | 0.039 | 0.955 | 1.022 |
| AI5 | | 0.267 | <0.001 | 0.892 | 1.399 |
| Cultural Heritage Preservation (CHP) | 0.925 | | | | |
| CHP1 | | 0.058 | 0.234 | 0.422 | 1.160 |
| CHP2 | | 0.209 | 0.004 | 0.850 | 1.382 |
| CHP3 | | 0.091 | 0.017 | 0.528 | 1.147 |
| CHP4 | | 0.149 | 0.030 | 0.814 | 1.335 |
| CHP5 | | 0.046 | 0.024 | 0.634 | 1.331 |
| Opera Music Quality (OMQ) | 0.845 | | | | |
| OMQ1 | | 0.330 | <0.001 | 0.800 | 1.636 |
| OMQ2 | | 0.243 | <0.001 | 0.922 | 1.636 |
| OMQ3 | | 0.207 | 0.004 | 0.902 | 2.070 |
| OMQ4 | | 0.030 | 0.357 | 0.738 | 1.167 |
| OMQ5 | | 0.124 | 0.054 | 0.251 | 1.098 |
| Digital Transformation (DT) | 0.869 | | | | |
| DT1 | | 0.123 | 0.040 | 0.729 | 1.097 |
| DT2 | | 0.033 | 0.375 | 0.472 | 1.209 |
| DT3 | | 0.072 | 0.228 | 0.379 | 1.141 |
| DT4 | | 0.061 | 0.223 | 0.626 | 1.111 |
| DT5 | | 0.073 | 0.180 | 0.764 | 1.219 |

## Results

4.1 Respondents' Demographics

The demographics of the respondents indicate that 12.06% had working experience in the cultural heritage or opera music field of 0–5 years, 16.35% had more than 15 years, 33.46% had 11–15 years, and 38.13% had 6–10 years of experience. In terms of highest academic qualification, 32.7% of the respondents had a master's degree, while 19.8% had a bachelor's degree, 20.1% had a higher national diploma, 12.9% had a postgraduate diploma, 10.3% had an ordinary national diploma, and 4.2% had a doctorate. Regarding job designation, 43.58% were cultural preservationists, 34.24% were opera performers, 14.01% were AI experts, and 8.17% were senior managers.

4.2 Common Method Bias and Non-Response Bias

Common method bias (CMB) could be a concern in this research since data were obtained from a single source. Both procedural and statistical measures were adopted to ensure no CMB in the study (Bozionelos & Simmering, 2022). The dependent variable (Opera Music Quality)

was measured on a seven-point Likert scale, while other variables were measured on a five-point Likert scale. This alteration reduces the likelihood of CMB. The questionnaire was anonymous, reducing potential biases. Statistically, Harman's single-factor test showed a variance of 8.248%, below the 50% threshold, indicating acceptable CMB levels. The responses of both the compensatory and univariate methods used by Armstrong and Overton (1977) for the presence of non-response bias will be compared. The difference between early (first 25%) and late (last 25%) responses was not significant (p > 0.05), which indicated that non-response bias did not have any effect.

## 4.3 Measurement Model Evaluation

The formative measurement model was evaluated for convergent validity, indicator multi-collinearity, size and significance of indicator weights, and contribution of indicators (Kumar & Padhi, 2022). Results are shown in Table 3. Convergent validity was confirmed through redundancy analysis, with values above 0.7 for all constructs (Saeed et al., 2022). Variance inflation factor (VIF) values were below 3.0, indicating no multicollinearity concerns. Indicator weights were statistically significant (p ≤ 0.05) except for AI1, AI6, AI8, DT4, DT6, DT8, OMQ4, and OMQ5. Insignificant indicators were retained due to their substantial outer loadings (> 0.5) (Hair et al., 2020a).

Table 3: Full Collinearity VIF

| Constructs | Full collinearity VIF |
|---|---|
| AI | 3.251 |
| CHP | 1.930 |
| OMQ | 1.631 |
| DT | 3.753 |

## 4.4 Structural Model Evaluation

Structural model assessment involved evaluating collinearity, path coefficients, the coefficient of determination ($R^2$), effect sizes ($f^2$), and predictive relevance ($Q^2$) (Hair et al., 2020a). Results are shown in Tables 3 and 4. Full collinearity variance inflation factor (FCVIF) values were below 5.0, meeting Onubi et al. (2024) Threshold. An $R^2$ value of 0.37 indicates substantial predictive accuracy. The $Q^2$ value of 0.461 suggests adequate predictive relevance (Galvão et al., 2023).

### 4.4.1 Hypotheses Testing for Direct and Mediating Effects

Hypotheses testing results are in Table 4. AI significantly impacts Cultural Heritage Preservation (p = 0.004, β = 0.207), supporting H1. Digital Transformation mediates the relationship between AI and Cultural Heritage Preservation (p = 0.015, β = 0.118), supporting H2. Cultural Heritage Preservation significantly affects Opera Music Quality (p < 0.01, β = 0.638), supporting H3. Regarding effect sizes ($f^2$), Cohen (1988) consideration is held. AI has a small positive impact on Cultural Heritage Preservation, Digital Transformation is supplying a medium-level mediation effect, and Cultural Heritage Preservation has the strongest relationship between variables as an explaining factor. The Indirect Effect -on Cultural Heritage Preservation through Digital Transformation in the current research presents a moderate effect through partial

mediation (Beebe, 2023, 2024). According to the VAF values of 33% - which show partial mediation - the researcher comes to the conclusion set out in H2.

Table 4: Hypotheses Testing Results

| Hypothesis | Relationships | p-value | T-ratios | Path Coefficient ($\beta$) | Effect size ($f^2$) | Comments | Decision |
|---|---|---|---|---|---|---|---|
| H1 | CHP → AI | 0.004 | 2.679 | 0.207 | 0.095 | Significant | Supported |
| H2 | CHP → AI → OMQ | 0.015 | 1.872 | 0.118 | 0.218 | Significant | Supported |
| H3 | CHP → OMQ | <0.001 | 9.076 | 0.638 | 0.365 | Significant | Supported |
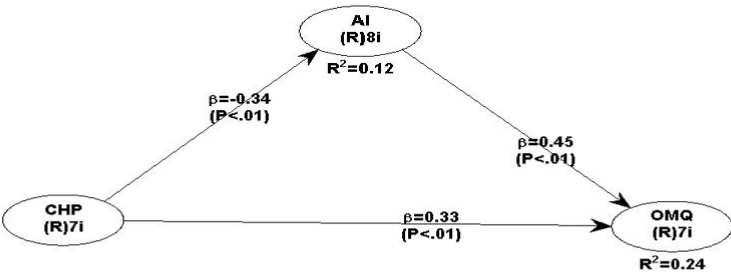


Figure 2. Structural model results
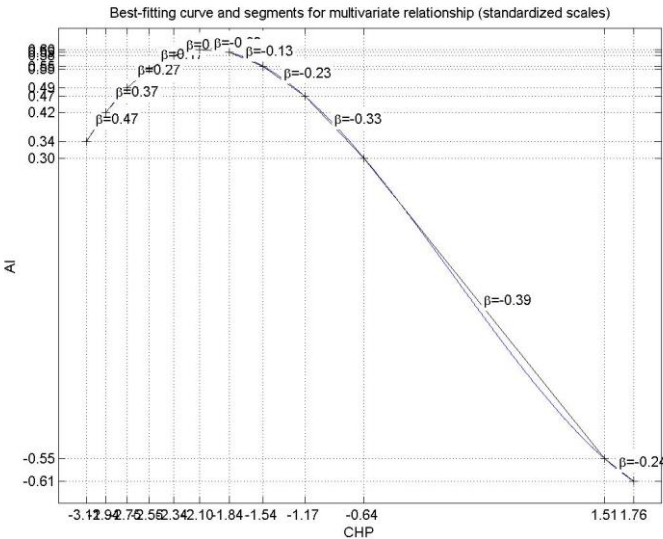


Figure 3 result 1 for the link CHP → AI
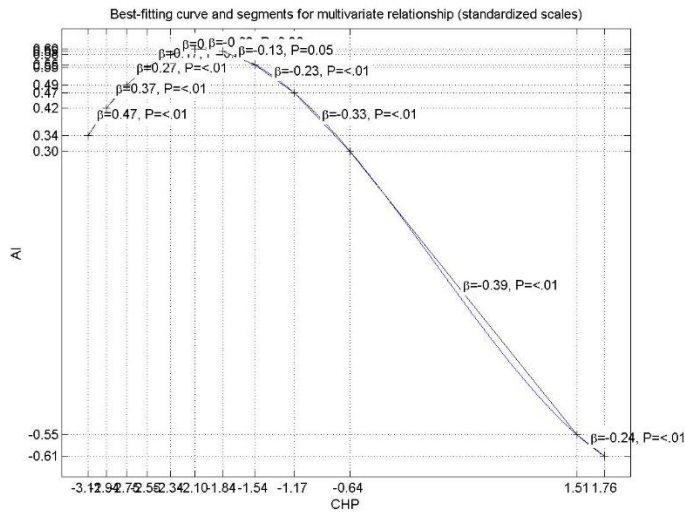
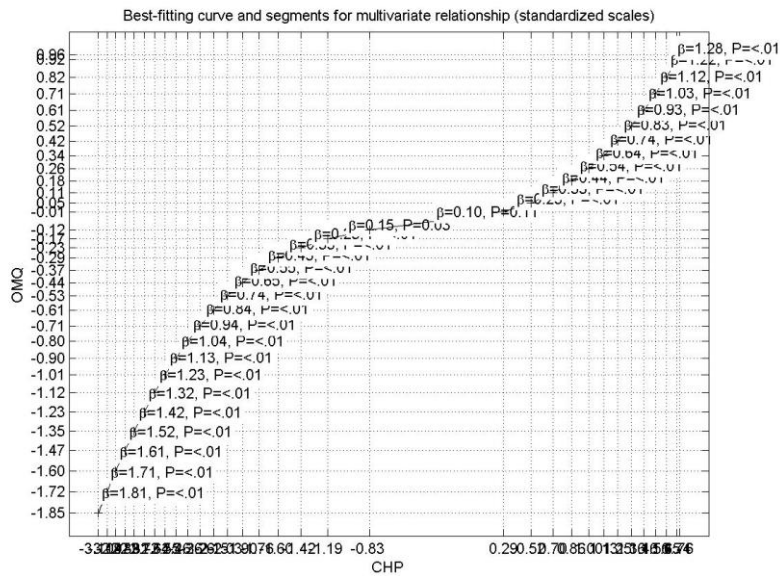Figure 4 CHP → AI link results in 2



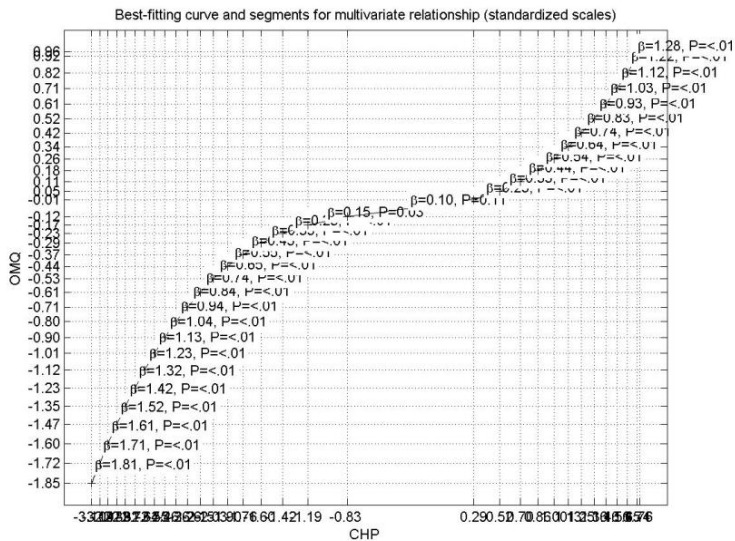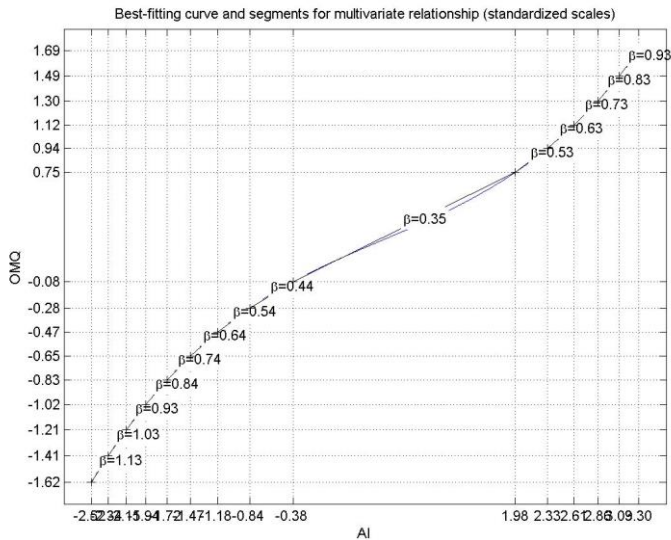Figure 5 CHP → OMQ line result 1

Figure 6 CHP → OMQ line result 2
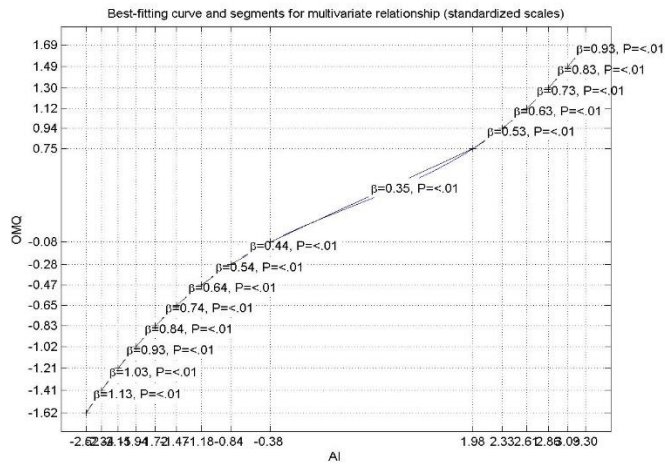


Figure 7 Result 1 AI → OMQ

Figure 8 result 2 AI → OMQ

## Discussion

The present investigation indicated whether Cultural Heritage Preservation (CHP) influences Opera Music Quality (OMQ) and the intervening factor of Artificial Intelligence in this relationship. The results provided evidence indicating that oath: CHP leads to OMQ as described in H1. Still, AI only plays a partial mediating role in some of the CHP-OMQ associations, and CHP is strongly positively associated with OMQ, as mentioned in H3.

### 5.1 The Effect of Cultural Heritage Preservation on Opera Music Quality

Nothing but good has transpired due to the enormous influence of CHP on OMQ. As CHP initiatives increase, the process of maintaining culture results in a corresponding increase in the quality of opera music, which is established as H1. This finding adds weight to the already-suggested fact that artistic culture and cultural preservation are highly interlinked, as they work together beautifully in practice.

### 5.2 Mediating Effect of Artificial Intelligence on the Relationship Between Cultural Heritage Preservation and Opera Music Quality

The implications of the second hypothesis (H2) are interesting, with findings illustrating that AI is a mediating factor in the relationship between CEH and OMQ. However, the mediation is not only partial, suggesting that while CHP is a factor in increasing the OMQ, AI helps maximise this effect. This observation is that AI has the potential to process enormous quantities of past information, pull out patterns from this information, and present new music compositions and performance methods, and this helps to develop the opera. It complements the bodies of knowledge that point out technology in improving cultural preservation and the quality of the show.

5.3 Effect of Cultural Heritage Preservation on Opera Music Quality

Thus, the results show that OMQ is greatly related to (or improved by) CHP, as in H3. This outcome mirrors research, which has shown that the adoption of this discovery can often be linked to old research that directly exemplifies the influence of preservation methods on artistic quality and performance. The brilliance of renewed preservation can best be ascribed to the growth of knowledge that helps keep history accurate and the increased attraction by the sense of belonging to a rich culture.

## Implications of the Study's Findings

6.1 Theoretical Implications

One key theoretical conclusion to this research will be to a large extent. One important finding from this study is that the correlation between CHP-OvQ exists when the impact of AI is taken into consideration. Also, it differs from annotated art preservation and opera music by using AI, so a fresh view of the art applications can be depicted.

6.2 Practical Implications

The final results also pointed out the practical implications that can be of help to the cultural heritage and opera music stakeholders. First, as the effect of CHP on OMQ is immensely significant, it is advisable to support ornaments sufficiently so that the music is performed at its best. Second, through AI's computing ability, we can further emphasise and increase the effects of both technologies, as mentioned earlier. Professionals also need to look into automation tools in their data and techniques assessment to improve the levels of performance of the experts as AI tools are introduced. Also, through the direct positive impact of CHP, another core factor CHP on OMQ is shown, that performance can be upgraded with just preservation efforts. This will, therefore, motivate the parties involved to prioritise the conservation of CHP in order to have it in good shape.

## Conclusion

Hence, the study aimed to investigate the influence of CHP on OMQ, taking into account the role of AI in the relationship between CHP and OMQ. From the results obtained, all three of the assumed links are significant. Therefore, the main focus has to be on the policymakers who will help implement CHP and AI technologies that are instrumental in optimising the quality of opera music performances.

## Limitations and Directions for Future Studies

There are still some weaknesses of the study that other studies can improve on in the future. The survey may have restricted the quality of the answers as the structural approach and closed questionnaires were employed. New studies could change the way of research and use qualitative

methods such as the interview or the mixed methods approach instead to provide further understanding of the topic. Also, the research took into account a small area only. Hence, future investigations can find similar relationships in diverse geographies so as to make good comparisons. In the development of research papers to investigate the correlation between public support, participation in the art form, job control, and opera quality production, there is room for the appearance, elucidation, and discussion of other factors.

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