

Intergenerational Transmission of Digitized Intangible Cultural Heritage: A Study from the Perspective of Innovation Diffusion Theory

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Abstract. The challenges presented by the trends of globalisation and digitalisation are faced by the intergenerational transfer of the intangible cultural heritage (ICH) on both fronts: the aging of knowledge bearers and low engagement of youth. Nevertheless, with the advent of such technologies as generative AI and the Metaverse, there will now be additional opportunities in the living transmission of ICH. The challenges like the lack of technical compatibility and the loss of cultural authenticity are bottlenecks of digitisation of ICH today. The theory of innovation diffusion is employed in this paper and concentrates on two aspects: such as technology bridging generational cognition and digital empowerment and cultural authenticity. However, based on a literature review and a case study, it examines in a systematic way how digital technology redefines the subject of transmission, cultural space, and value logic of ICH. The authors concluded that the use of short videos and the generative AI can increase the level of participation among the young population due to the opportunities of scenario-based narratives, yet excessive entertainment can very easily engage in the so-called symbolic dislocation crisis of intangible cultural heritage practices and cultural identity crisis. According to the situation above, a collaborative route of 3+2+1 allows constructing a viable paradigm so to achieve a balance between the promotion of innovation and cultural safeguarding, which has theoretical and practical implications to intergenerational transmission of intangible cultural heritage in a more sustainable way.

Keywords: Intangible Cultural Heritage (ICH), Innovation Diffusion Theory, Digitalisation, Intergenerational Transmission.

1. Introduction

Intangible cultural heritage is the main transmitter of the cultural genes of a nation - the important cultural characteristics passed to the other generations. Nonetheless, it has structural issues in terms of its intergenerational transmission. The two aspects that create this crisis are that the primary heritage bearers are aging and also the youth are culturally absent, there is no participation mechanism and a lack of cognitive alignment. The traditional oral-experience-oriented transmission as it was understood is fundamentally closed, which contradicts the open dissemination levels of the digital age. These issues endanger the civilizational pillars of ICH when content with technological adaptation imbalances.

Meanwhile, the innovation of digital technologies has transformed radically the ICH preservation, dissemination, and innovation process and shifted the model of transmission to the virtual co-creation model. But the teleological thinking of classical Innovation Diffusion Theory is not able to provide explanations of bi-directional interaction of new media setting [1]. Thus, the transformation of the intergenerational mechanisms of collaboration with the aid of digital tools balancing between the empowerment of technologies and cultural originality became the key to the sustainability of ICH transmission.

The tripartite synergy of technologic, cultural, and intergenerational is the empirical framework that is adjusted to the work since it utilizes the Innovation Diffusion Theory as a framework of the analysis. Through literature analysis we give a critical review of the world-wide application of digital technology in the dissemination of the ICH such as intergenerational and ethical consideration. There are also case studies discussing the digital tools transforming the relations between the heritage subjects, cultural spaces, the value system that reveal the background factors of intergenerational cognitive disjunction and tensions of techno-ethics. Using a cross over into the parameters of linear theoretical constraints and the inclusion of intergenerational cognition and tech-ethics into our theoretical construct, we create a three level model:

Technological adjustment stratified.

Cultural gene preservation.

Intergenerational synergy.

This explores an online marketplace which enhances youth participation and alleviates the genuineness of ICH.

There are two theoretical-practical contributions to the study. Theoretically, its introduction of technological authenticity (meaning. . .) and bi-directional empowerment plans introduces into the ICH transmission theory the digital humanities perspectives with the pivot of paradigm changes of instrumental rationality to value-based symbiosis. As a matter of fact, it has established positions of technological adaptation quantification, intergenerational community strategies, and metaverse solutions that provide policymakers with ethical principles in the form of ICH digitization or age-friendly design principles. This will enable the traditional culture to obtain the living heritage status in the digital civilization and ultimately heal the transmission gap as well as reintroduce cultural innovation.

2. Research background and significance of the research

2.1. Intangible cultural heritage across generations

There is a grave structural problem in the intergenerational preservation of intangible cultural heritage (ICH). Aging of the primary bearers of ICH is a growing trend whereby most of the core practitioners are aged. In the meantime, the younger generations undergo cultural, disconnection because of the cognitive distance and lack of engagement avenues, which does not allow understanding the cultural importance of ICH or being effectively involved in the practice of its transmission.

The old system of oral transmission does not survive in the era of information technology. The fact that, on the one hand, it is closed and regional does not match with the open and instantaneous media consumption habits of the youth, and the understanding of ICH cultural expression and paradigms of distribution created by digital technology has not yet established a productive linkage, on the other hand. The young generation, on the one hand, has the open and immediate habits of using the media, which is contrary to the closed and localized nature of the digital technology allowing the expression of intangible cultural heritage and the dissemination paradigms; the logic of the intangible cultural heritage expression and the dissemination paradigms provided by the digital technology are not yet in the proper connection. Not only may intergenerational disconnect result in real gaps in

covering the skills, but also in communal absence of cultural identification which places the capacity of any intangible cultural heritage as a cultural gene of the nation in an all time crisis.

2.2. Digital technology opportunities and risks empowerment

The development of the digital technology has made new opportunities in the intergenerational transmission of the intangible cultural heritage (ICH), yet has created potential threat of cultural deconstruction. The most recent technologies including generative AI, the metaverse, or blockchain are redefining the rational in ICH transmission. On the one hand, the quality of the technological tool develops time and space barrier of the traditional broadcasting by the scenario-based narratives and immersion, providing the young people with the opportunity of low threshold, high-interaction methods of participation; on the other hand, the technology too and the cultural heritage contradict each other with their instrumental rationality and value rationality, respectively. Traffic logic based on algorithms has the tendency of reducing intangible cultural heritage methods into symbolic pieces, degrading their cultural context and spiritual essence to the point where it has resulted in a symbolic dislocation crisis.

Generational differences in technological adaptation are also a source of these contradictions. The youths following the on-demand forms of entertainment do not match the seriousness of traditional means, and the ones who succeed in technology are being abandoned in the digitalisation age, showing generational power imbalances of the generations technologically enabled through digitalisation. The technological empowerment produces a two-edged sword which must be addressed by the dynamical relationships of the cultural ethics and the technological rationality.

3. Literature review

3.1. Necessary paradigm of innovation diffusion theory

This is a new trend of cultural sharing through the internet which has transformed how culture is conserved and reinvented and the Rogers theory of innovation diffusion has presented a great system of analysis in understanding such a trend. This theory states that innovation diffusion process has five stages including cognition, persuasion, decision making, implementation and confirmation. Human beings go through the dynamics of being aware of the innovation, attitude, decisions, translation and ultimately validation of their decisions along the way of looping between attitude and choice making (as it can be seen in Figure 1) [2]. This process influences innovation diffusion in terms of some variables of the social system and recipient variables. The factors as recipients could include some of the variables as personal (general attitudes towards change), social (worldism), and perceived innovation needs and social system variables like social system norms, deviance tolerance, and the nature of communication in general. Other perceived features of innovation are relative superiority, compatibility, complexity, trialability, and observability that form part of the innovation diffusion.

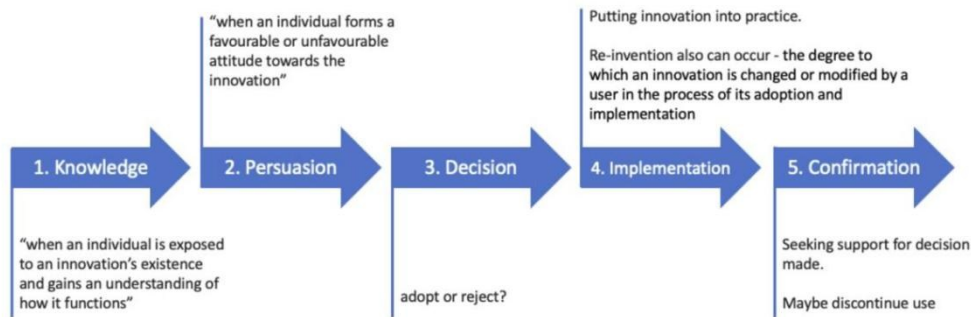


Figure 1. Rogers' description of the innovation adoption decision-making process [3]

The form of innovation diffusion is that of adoption curve as shown by Figure 2 and is slow at the beginning. As the number of adopters reaches a critical mass the adoption starts to assume a sudden increase, hence the growth rate in this case has been observed to reduce till the market is saturated. The mass communication performs its task of the wide distribution of the information in the process of diffusion and interpersonal communication is the most effective one in the process of persuasions. The two are complementary to one another since they influence the success and evolution of diffusion of innovation.

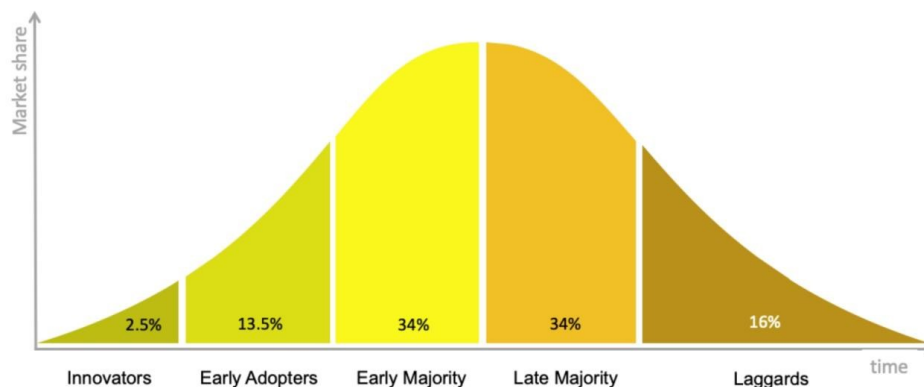


Figure 2. Rogers' adoption curve [4]

The theory provides an effective theoretical platform on which the framework is established in the discussion that follows. Firstly, its stage-based classification also helps to examine the behaviour and attitudes of the various generational categories based on the various stages of the process of digital dissemination of intangible cultural heritage (ICH), thereby clarifying the key point of interest and concerns of dissemination. An example is that mass communication can be utilized during the awareness stage to promote awareness related to digital production of innovation as far as ICH is concerned; interpersonal communication can be exploited during the persuasion stage to ensure that intergenerational understanding of the cultural value of ICH can be realized. Second, S-curve tendency shows that the process of sharing intangible cultural heritage in the digital age is likely to be considered as a process that will need to be slowed down in the initial stage, thereafter, there will be massive promotion in the rapid growth stage, and decision to adopt highly sophisticated operations toward the saturation stage. Finally, the variable analysis reports concerning the effects of the different demographic factors and social environmental factors on the dissemination of the intangible cultural heritage in the digital era, which will assist in coming up with more precise and even

adaptable dissemination processes capable of resulting in effective transmission and creative development of the intangible cultural heritage in the digital era.

3.2. Domestic and foreign research progress

3.2.1. Present state of domestic research

With the related research becoming more in-depth, localised international studies have addressed the localisation of the digital technology application, in the distribution of intangible cultural heritage and intergenerational tensions. According to Deng Jianguo and Zhang Qi, in their article, Innovation, diffusion and challenges of mobile short videos, Douyin has a programme, the Intangible Cultural Heritage Partner Programme which increased the dissemination performance of Mialis silver jewellery by 300, yet 78 percent of the second creations of the young people simplified the cultural symbols, in-depth meaning interpretation is in built conflict with the technological empowerment [5]. In their publication Path Analysis of Digital Technology Empowering Intangible Cultural Heritage Transmission, Li Xin and Zhang Wei discovered that 45 percent more young people participated in the metaverse technology but the elderly inheritors did not, only 12 percent, because of the barriers of the equipments, pointing to the manifested generational block in the digital adaptation [6]. Regarding theoretical modifications, Wei Wenhuan focused age-friendly design in a specification of Rogers, the Innovation Diffusion Theory and proposed that the complexity of intangible cultural assets apps operation should be decreased by 60 percent to boost the degree of Sameness among the aged population [7]. Based on the case study and the Zhejiang-Fujian territory, in the article Chen Xiao and Wang Lei identified that the young generation employed short video symbolic translation, reducing both cultural cognitive barrier and mortise-and-tenon structure with 3D animations, to deconstruct the cultural heritage (Intergenerational Digital Inclusion in Intangible Cultural Heritage Transmission: an Empirical Study at the Co-creation of Short Videos at Zhejiang-Fujian User of the Wooden Arch Bridge Construction Techniques, 2013, p.203 Nevertheless, 37 per cent of elderly inheritors also thought that the spirit of craftsmanship was being destroyed. The research suggested in the paper the so-called Intergenerational Digital Inclusion Index (IDII) as the measure of collaborative effectiveness [8]. In their article titled Intergenerational Cognitive Bias in Intangible Cultural Heritage Short Videos: A Case Study of Suzhou Embroidery on Douyin article, Huang Xiaoyang and Zhou Xiaohong examined 120, 000 data points of video data and discovered that, under algorithm recommendation systems, there is greater predisposition to push more content that will appeal to younger users that to middle-aged and elderly users by positioning it on the content page as a trending video or an instructional video on mastering the technique respectively. They proposed the creation of a database of label grading labels of non-heritage content [9]. In their article A Comparative Analysis of Intergenerational Inheritance Models of Non-heritage Digitalisation between Eastern and Western region A Case Study of Gansu Incense Bags and Hangzhou Silk, Liu Yang and Li Siyu compared and discovered that western regions of China are use to technical training that is led by government, whereas the eastern regions are use to youth entrepreneurship that is affected by the market. They creatively presented a two-dimensional model of adaptation to the region and across generations, that is, the model of the so-called: regional-intergenerational model [10].

3.2.2. Recent condition of foreign studies

The foreign study provides cross-cultural information on technological ethics and cross-generational memory. In such a way, according to Kim in the article Digital Heritage and Intergenerational Transmission 65 percent of the population raised awareness of the traditional rituals due to the involvement of the young people in the design of the virtual ritual objects in South Korea in the project called Ancestral Shrine Ritual VR Restoration. This shows that, with technology

empowerment, the youths would be able to shift away the frames of being seen as cultural consumers to become co-creators of value [11]. Nevertheless, Manovich in *Software Defines Everything* emphasizes the possible dangers of algorithmic recommendations as the tendency towards the easy cultural interpretation to the intangible cultural heritage owned by YouTube has cut the traffic share of the solemn videos in craft-related categories to 19, thereby increased the influence of the entertainment-based bias in the content [12]. And other researchers in {Measurement of Authenticity in Digital Heritage Interventions: A Mixed-Methods Framework Balancing Innovation and Preservation} have created an evaluation system that integrates quantitative measurements and qualitative analysis using the examples of the British Museum ar guided tour project to support the idea that the fact that dynamic authenticity is permanently measurable under the impact of a technological intervention is validated and then offers the methodological basis of creating the standards that would allow balancing technology and authenticity [13]. In the five-year case study of the Canadian Indigenous communities, Fernández-Llamas et al. suggested the model of dual-path and cultural-technological trust indexes, in the article *Maintaining Intergenerational Participation in Digital Heritage: A Five-Year Case Study of Youth-Led Co-Creation in Indigenous Communities*, where the authors showcase the factors that become central in the change mechanism of an intergenerational technological feedback [14]. In *EAST-WEST Clashes in Digital Heritage Dissemination: Differences in Memory Preservation Procedures on TikTok and Instagram*, Zhang and Liu contrasted the models of Eastern and Western dissemination, finding the strategic divide between Eastern, so-called ritualistic participation, and Western, so-called individual narrative, and highlighting the joint-constitutional moderating effect of the algorithmic logic and the cultural context on the dissemination results [15].

3.2.3. Research gaps

However, residence studies have now gone beyond popular use of technology to their underlying contradictions like intergenerational cognition, algorithm ethics, and geographical variation. Foreign studies have also seen a wide array of thought and factual support on the theoretical model and practical optimisation of intangible cultural heritage digitalisation in the field of intergeneration cooperation, technological ethics, and comparative cultures. Although proving the effectiveness of dissemination of technology-mediated strategies, such studies have also uncovered the practical obstacles of losing cultural authenticity and intergenerational power dynamics and present multi-dimensional empirical data to conceptualize the localisation framework that draws together such approaches as technology adaptation, cultural preservation, intergenerational collaboration. ’

However, quantitative parameters of the interaction between the use of technology-based solutions and the cultural authenticity have no quantitative criteria in the existing studies and it becomes difficult to determine the extent to which the technological applications change the cultural authenticity. The efficacious mechanisms of intergenerational technological feedback are yet to be successfully demonstrated and the intergenerational interaction patterns are not considered to be sustainable yet. It is also factual that there is a lack of in-depth comparative studies of Chinese and western models in relation to communication that do not provide true reference to local practice of communication. Future research could come up with three-dimensional instrument, whereby they model technology-cognition-ontology, in a bid to address the limitations of instrumentalism, trying to identify ways that could be viable in following a sustainable path which will not merely entail use of technology, but also preserve cultural heritage presented as a theoretical basis to the intergenerational communication of intangible cultural heritage in the digital world.

4. Pathways innovative approaches to the digital delivery of intangible cultural heritage the 3+ 2+ 1 practical paradigm

The suggested solution also includes the so-called 3+2+1 approach to collaboration, which would be useful in terms of dealing with the root issues in the process of the digitalisation of ICH such as technological mismatches, the absence of a cultural authenticity, and the absence of intergenerational collaboration. These include establishment of three-layered foundation of the digital media and cultures genes and intergenerational co-creation, establishing technical compatibility criteria and a dual-mechanism of the cross-generational operations of the digital community. A metaverse space of immersive interaction will as well serve as the carrier of the space in an effort to accommodate the symbiotic relation to technological empowerment and cultural heritage preservation.

4.1. Three core foundations

With digital media, offer graduated technologies to fulfill intergenerational needs. In the case of younger viewers, create low- barrier, massively interactive online solutions. In the case of the older inheritors, focus more on the technological innovation of the further evolution of technology in order to maintain the authenticity of culture and ensure that the existing technologies do not infringe upon the cultural heritage including the genetic code.

Regarding genes on culture, put in place mechanisms of safeguarding the essence of intangible cultural heritage, as it would then be clear that the principle of not erode techniques and symbols should be put in place. As an example, in the Shaanbei paper-cutting case, the industry associations and platforms have collectively decided that the ratio of traditional patterns applied in the creations should not be below 80 percent and additions of folk stories must be incorporated on the description space to avoid the creation of techniques into mere visual representations. The rule will improve the awareness of the cultural meanings of paper-cutting by the young users, and they are driven by the technological innovation to spread even more cultural content instead of breaking the shape of it.

Regarding intergenerational co-creation, a collaborative mechanism that is empowering to both should be created to disrupt the one-way penetrating model of technology. The interpretation of core techniques can be led by senior artisans, whereas interaction design is done by young teams, thus an intergenerational symbiotic model is created in which experience carries experience and innovation direction. This enables the customary methods to experience a resurgence in the spread of their momentum via digital media.

4.2. Dual-drive mechanism

Develop a comprehensive process ethical system with references to the index of technical adaptability in order to assure the compatibility of technology applications with the nature of intangible cultural heritage inheritance. Cultivate a cultural co-creation community through intergenerational operation of the digital communities and construct a three-party collaborative digital community. Encourage intergenerational exchange by organizing division of labour and using incentive approaches, to build a co-creation loop that enhances community cohesion and pushes the youth fulfilling the role of spectators instead of disseminators to become a participant in the production of intergenerational shared cultural meaning to build an intergenerational network of shared cultural meaning production.

We have used technology adaptation guidelines as a foundation in order to build an end-to-end ethical model so that technology applications will be consistent with the nature of the intangible cultural heritage care. As a case in point, using digital communities intergenerational, we develop a community of cultural co-creators. We develop a virtual society in which three creative partnerships will be involved: master craftsmen/young creators/ ordinary users. We encourage intergenerational interaction through the mechanisms of division of labour and the incentive strategies. Close-circle of

skill transmission–technological application-user participation: This relationship requires a closed loop of co-creation which implies developing a close network among community members. Turn youths into viewers into intermediaries so as to create a generational network in the creation of shared cultural sense.

4.3. A core scenario

With the help of metaverse, a new scenario of the compound of the virtual and physical has been developed in distributing intangible cultural heritage, which has enhanced physical cultural spaces to the digital symbiosis. Jingdezhen Ceramic Metaverse Workshop is an installation based on VR technology to recreate the complete process of the mining procedure-kneading clay-shaping the clay-firing the kiln in a one to one scale. Virtual clay can be used with the help of the users and their hands just by putting the corresponding equipment. There were participants who said that it was the first time they realized the technical difficulties in the art. This has contributed to high influx of people to the Jingdezhen Ceramic offline experience stores to gain a cognitive breakthrough between observation and practice.

The scene operation is integrated with a cultural element monitoring system which real-time analyses the percentage of elements in the creative content of the users which were of traditional elements. Besides satisfying the end-user requirements of the young generation towards interactivity and novelty, this model of immersive experience together with data-driven detection offers the elderly inheritors a transcendent space to impart skills, thereby providing creative transformation of the intangible cultural heritage spaces in the digital era.

5. Conclusion

The digital technology has an irrefutable policy of the two-sided sword of transferring the intergenerational cultural heritage (ICH). On the one hand, the low-entry and high-interactive participation opportunities of young people in ICH dissemination may be offered with short video and metaverse technologies, offering this category of participants a broader range of coverage and engagement with the dissemination of information. The instrumental rationality technology, to the contrary, may even cause the simplification of the cultural situation and spiritual essence of ICH techniques leading to the dissemination bias. The technological fluctuations between the generational successions and the disparity in mental cultural gap play a part towards worsening the structural discrepancy within the mode of hierarchy of inheritance.

The article breaks the traditional theories when it introduces intergeneration cultural cognition and technological ethics to the analysis system that propounds the theoretical perspective of the digital transmission of ICH. In addition, it establishes the norms of technological adaptation and patterns of intergenerational cooperation, which is used in practice of safeguarding ICH in a practical manner. The intergenerational bi-directional co-creation of culture, intergenerational, the idea of technical layered adaptation, and the concept of intergenerational and cultural authenticity, represent the pragmatic paradigm that ensures efficiency in diffusion of innovation, to which attention is devoted towards cultural authenticity to establish the mechanism of systematic solution to the cross-generational gap in ICH.

In conclusion, collaboration mechanisms could be used to take advantage of the opportunities of culture diffusion offered by digital tools and assist in counteracting the threat of culture alienation. The additional research will be grounded on the profound development of technological ethics, take into consideration the opportunities of sustainable solution to intergenerational collaboration, and provide the comparison of the models of digital sharing of ICH within the different cultural contexts. This will further refine the theoretical and practical paradigm of the synergistic arrangement of type

of work between technology-culture-intergenerational that can determine the proposition of ICH into the digital age as both blatantly aesthetic and authentic. ’

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