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This PhD plan explores the integration and optimization of Extended Reality (XR) technologies within the creative industries, aiming to enhance innovation, engagement, and economic sustainability. Despite the promising applications of XR in enhancing interactive experiences across various sectors, its adoption in the creative industries faces significant obstacles, including technological acceptance, accessibility, content diversity, and integration difficulties. These obstacles give rise to an important challenge: what business models can better support the integration of XR in the creative industries? This plan addresses this challenge through a comprehensive approach, including a systematic literature review, expert interviews, case studies, and user surveys, to develop an innovative framework that facilitates the effective implementation of XR. The research is expected to propose novel business models that can be adopted by stakeholders within the creative industries to leverage XR technologies effectively. By doing so, the study aims to contribute to the sustainable growth and competitiveness of these industries, reinforcing the role of XR as a catalyst for innovation and creativity.

Additional Key Words and Phrases: Extended Reality, Business Model, Creative Industries

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1 PROBLEM STATEMENT AND RESEARCH QUESTIONS

The creative industries, which encompass a diverse range of activities from arts and cultural services to publishing and media, play a pivotal role in economic, social, and cultural development[1][12]. Particularly in economic terms, these industries are an important source of innovation, generating new ideas, intellectual property, and employment opportunities[1]. Meanwhile, the globalization of the creative industries has expanded their influence, increasing exports and imports, which in turn affects employment and economic growth positively[15]. Technological innovation plays a positive role in promoting the creative industry.

Extended Reality (XR) technologies, including augmented and virtual reality (AR and VR), have shown immense potential. In the industrial sector, they can be used for innovative human-machine interfaces, remote maintenance, and virtual training[8]. In the retail industry, they can improve the customer experience, training, and product development[18]. In higher education, XR can provide immersive learning experiences[4]. Similarly, the potential of XR is highlighted in content creation, like film, television, and creative design in the creative industry[13][2].

Despite its potential, the adoption of XR technologies remains limited due to several obstacles. To begin with, accessibility: the technology is often bulky, people can experience motion sickness, the devices are often expensive and difficult to use for the non-tech savvy. This challenge leads to requirements for a low-threshold XR, for instance, wireless XR that can enhance mobility and user experience[3] and 5G networks that guarantee data rate and reliability[14]. Also,

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organizational drivers, such as top management support and long-term planning[22], the cost barrier of XR devices, and uncertain possibilities and interdisciplinary applications[9] have slowed down XR adoption. In order to overcome these obstacles, there is a need to rethink the business models of XR in the creative industries with defined and clearer business cases. [21].

Therefore, this study aims to develop innovative business models for the implementation of XR to enhance growth and sustainable development in the creative industries. The research will be guided by the following research questions:

RQ1: What are the current trends and best practices for the business models in XR in the creative industries?

RQ2: What are the key factors influencing the adoption of XR and value creation, for the creative industries from the providers perspective?

RQ3: How effective is XR in the creative industries from the customer perspective?

RQ4: How can the identified success factors and best practices be integrated into innovative business models tailored for XR in the creative industries?

2 METHODS AND RESEARCH DESIGN

This study will be grounded in the area of management and technology. The study plans to employ a mixed-methods research design, including qualitative and quantitative methods, to address proposed research questions. The following table highlights how different methods will be used to answer the different research questions of this project.

RQ1	Literature Review
RQ2	Expert Interviews
RQ3	User survey
RQ4	Business Model innovation and workshop validation

2.1 Systematic Literature Review

A systematic literature review on business models of XR technology will be undertaken to investigate the current state of XR's adoption and revenue streams, following the academic guidelines [16][19]. The aim of this review is to identify existing knowledge gaps, trends, and challenges in this field. The findings of these reviews will contribute to the development of a theoretical framework for the study and provide a foundation for further empirical research. Specifically, the outcomes of the literature review will be used to guide the development of interview questions for the expert interviews and inform the design of the user survey.

2.2 Qualitative Study: Expert Interviews

To understand key factors that influence the comprehension, design and implementation of XR, 6-8 semi-structured interviews will be conducted with experts from XR suppliers, creative organizations and government to get a comprehensive view of XR, following the interview guidelines suggested[6][20]. The sample will include Tactic Game Company, Vapriikki Museum, YLE (the national Finnish Broadcaster), City of Tampere, Immersal, Virtual Dawn, Dispelix and Colossal Order. Examples of open-ended questions that will be included in the interview guide are: "What are key activities and key resources related to XR?", and "How do you manage revenue streams related to XR?" The interview data will then be analyzed using thematic analysis[7] to identify key themes and patterns.



Fig. 1. Caption

2.3 Quantitative Study: User Survey

A survey will be designed to collect data from potential XR users and creative industries audience, such as museum visitors from Vapriikki Museum and players from Tactic Game Company. It will follow research design principles[5]. The survey will aim to understand the user's perspective on the key factors influencing their engagement and satisfaction with XR businesses. Some of the scales that will be measured in the survey include perceived enjoyment, perceived usefulness, and ease of use, willingness to pay, based on existing validated scales from the Technology Acceptance Model [11] and Flow Theory[10]. The data collected through these surveys will be statistically analyzed to identify relationships and patterns. The findings of the user survey will be integrated with the insights from the literature review and expert interviews to inform the development of the conceptual framework and business model innovation. Similar to expert assessment, user experience survey will be conducted to test the proposed business models and framework. The data gathered will exhibit users' perspectives, which can reflect the potential of the business models and help improve them.

2.4 Business Model innovation and workshop validation

Drawing upon the preliminary data of the literature review, expert interviews, and user survey, several conceptual business models for XR implementation will be formulated. This business model will address the clear gap in existing research and reflect different operational methods, revenue streams, and user engagement strategies[17]. To validate and refine the preliminary business models, this study will organize a series of workshops aimed at further developing and refining these models through co-creation with industry experts and stakeholders. we plan to hold three workshops, each targeting a slightly different audience to cover various applications of XR technology. The first workshop will invite entrepreneurs and technology developers from the cultural and creative industries to focus on enhancing user experience and engagement. The second workshop will focus on XR provider companies to discuss the possibilities and challenges of new models. The third workshop will collaborate with policymakers to discuss policy frameworks and incentives to support these models.

3 PROGRESS

3.1 Work-in-progress literature review

A literature review on business models of XR is currently underway. This article will comprehensively collect and analyze the state-of-art papers on XR business models, discussing aspects such as industry, research methodologies, and business models. So far, 680 articles have been collected through two databases, and 120 of these are set for detailed analysis. The review has discovered various business models across creative industries, such as news, entertainment, gaming, and music. The completion of this review is expected by August this year.

3.2 Interview preparation

The next step will involve conducting expert interviews. The first task underway is to learn how to gain insights from literature review and formulate interview questions, including determining which questions are most relevant to the overall plan and which can provide more insights for the subsequent user survey. Next step is to learn the interview procedure, including scheduling and contacting interviewees, six of whom has been contacted including Tactic Game Company, Vapriikki Museum, YLE, City of Tampere, Immersal, and Virtual Dawn, understanding ethical considerations, and mastering how to ask follow-up questions in semi-structured interviews. Then pilot interviews are conducted. After the actual interviews, the materials collected will be organized and analysed.

4 CONCLUSION

This doctoral plan aims to introduce an innovative business model to optimize the potential of XR and promote its implementation in the creative industries, especially the Finnish creative industries. A focal point will be the development of innovative business models. It will provide guidelines and understanding for the XR landscape and potentially boost a sustainable economy.

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