**Title** : **Evaluation of the intention to use a augmented reality mobile application for wine purchases.**

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**Keywords :** SSIT, Augmented Reality, Wine advisor, Phygital, Mobile application

**Abstract**: The use of mobile applications has become a common practice for consumers today. In the context of in-store shopping, they turn to price comparison tools or applications that provide detailed product information. This research investigates the intention to use an augmented reality application. The application provides instant valuable information for wine selection, including storage recommendations, serving temperature, flavor profiles, and more. A convenience sample of 70 French participants is employed to validate the first phase of this research project

**Introduction**:

The primary aim of this research is to assess how the recommendations provided by an augmented reality (AR) application influence users' intention to use the application when selecting wines. This investigation is part of the broader research on Self-Service Information Technologies (SSIT) applied within the context of transforming traditional retail spaces into digital and physical hybrid environments, known as 'phygitalization.' Previous work by Feenstra & Glérant-Glikson (2017) has shown that consumers often struggle to perceive the value of AR, mainly due to the cognitive challenges associated with SSIT adoption. Additionally, Chung et al. (2015) have demonstrated that the use of augmented reality significantly impacts individuals' intention to visit specific destinations. Furthermore, Chen et al. (2022) have proposed an analysis of purchasing behavior through an augmented reality application.

Our study builds upon these three perspectives and provides a more comprehensive conceptual framework, drawing upon the Elaboration Likelihood Model (ELM) introduced by Petty & Cacioppo (1986) to emphasize the emotional aspect of application usage. To validate this framework, we conduct a unique and, to the best of our knowledge, unprecedented experiment involving the utilization of an augmented reality wine selection advisory application within a mobile purchasing context.

**Context:**

Presently, the primary wine purchasing assistance applications, namely Vivino with over 10 million downloads, WineAdvisor with over 100,000 downloads, and Abacchus with over 50,000 downloads, rely on visual recognition of wine bottles through photographs. Once the application analyzes and identifies the label, it guides the user to a standard product description page, offering community-contributed comments and ratings. This product description provides a single level of information, including an overall rating, grape variety(ies), recommended serving temperature, optimal storage duration, and some culinary suggestions. Regrettably, there's no option to customize the content of the product description to match the user's level of wine expertise. This three-step process (photograph analysis, redirection to a generic database) disconnects customers from the in-store experience, and the application's inability to create an immersive experience (Carù & Cova, 2003 ; Parboteeah et al., 2009) disrupts the fusion of physical and digital elements in service, commonly referred to as 'phygitalization' (Rivet et al., 2018 ; Batat & Hammedi, 2022). Additionally, the standardized nature of these product descriptions often fails to meet consumers' expectations for accuracy, with some finding them overly simplistic or overly complex

The objective of this research is to ascertain whether there is an intention to use an augmented reality application for wine selection. As antecedents to usage, we measure attitudes towards augmented reality through the effort required for its use and the performance anticipated by the consumer.

**Literature Review**

The term 'mixed reality' is employed to encompass various technologies, including augmented reality. The crucial element here is that the added value offered by the technology is exclusively available in situ (Bourliataux-Lajoinie & Riviere). The consumer must be in proximity to the product to benefit from the technology. Sensory interaction becomes particularly intriguing in this context, as the consumer can blend elements of the real environment (such as smell, temperature, objects, etc.) with the augmented creations superimposed on reality through their smartphone. These technologies find extensive applications in tourism, for instance, in the reconstruction of destroyed sites and the provision of supplementary information. The diagram below presents a continuum of standards, incorporating the intensity of sensory interaction and dependence on technology.

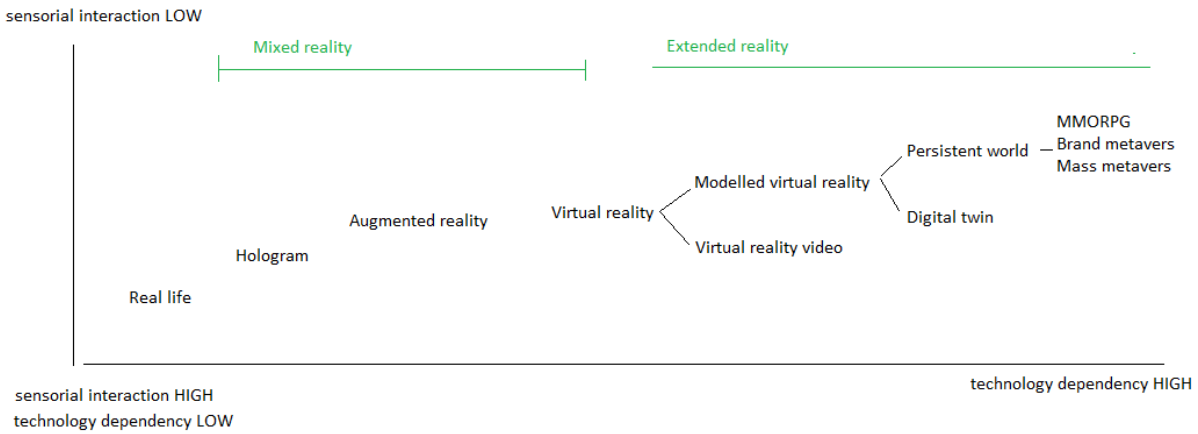


*Figure 1 - The continuum of technology / sensorial interaction (source: Author)*

The use of augmented reality, already widely employed in tourism to enhance sites, offers several advancements (Chung et al., 2015). First, the display of information is done in real-time through video overlay on the user's screen, presenting the information in a fluid and intuitive manner. Cognitive enrichment is integrated into the in-store customer experience, making it more "natural" to use the provided information. The user receives a regular information content, easy to read and minimizing the required cognitive effort (Kang, 2014; Feenstra & Glérant-Glikson, 2017). However, it is essential to measure the intention of using this technology for purchase advice and not limit it to the tool's playful aspect (Qin et al., 2021).

If the human-machine interface is visually appealing, the interaction with it will be more enjoyable (Parboteeah et al., 2009). Consequently, visual appeal is an aesthetic response that can be a significant element in any use of information technologies. Augmented reality is particularly interesting for this type of approach. By integrating information overlaid on reality, it maintains an aesthetically pleasing appearance for the user. Previous research has shown that AR systems enhance the user's view of the real world, and the user's familiarity with AR applications influences the perception of the usefulness and ease of use of AR applications. Widely used for website analysis and purchasing tourist packages (Parboteeah et al., 2009; van der Heijden, 2003), this relationship is underutilized in studies on IT services in retail.

Our conceptual model is structured in four stages. Firstly, the visual appeal brought by AR *Visual Appeal* (Liu et al., 2013), followed by a central cognitive component that measures the cognitive effort related to the use of the application *Effort Expectancy* (Venkatesh et al., 2003), and the *Performance Expectancy* (Chung et al., 2015), *Information Level*. The importance of creating a test version of the application is highlighted here, allowing users to project themselves into the real usage conditions. The third, more traditional phase, leads back to a

model of behavioral intention directly derived from the reasoned action model. The formation of an attitude towards augmented reality *Attitude Toward AR* (Chung et al., 2015) is measured, which induces an intention to use *Intention to use* (Venkatesh et al., 2003; Madan & Yadav, 2018).

Consumer expertise (self-assessment) holds particular significance in our case, as wine consumers especially value making their own choices. In France, a country with a rich wine culture, users often perceive themselves (whether rightfully or not) as having a good knowledge of wines. Therefore, the use of a mobile application based on augmented reality might seem intrusive or, conversely, a mere uninteresting gadget. It is thus pertinent to assess this expertise beforehand and examine its influence on the expected performance of the application

**Methods & materials**:

A test version of the application has been created (see Appendix 1 and Appendix 2), offering only information related to a wine bottle (controlled test dataset for the experiment). No additional services, such as memo sheets or oenology courses, are included. The experiment involves a sample of 70 participants through a panel company. Data collection is conducted between April and July 2023. Participants view an explanatory video on the application's usage (duration 1 min 30 sec), presenting the real conditions of using one of the three information customization levels (randomized video presentation). Subsequently, participants view a full-screen copy of the typical screen corresponding to the customization level presented in the video and are asked to complete a questionnaire on their usage intentions.

**Results & Discussion:**

A convenience sample consisting of 70 executing education students was used to validate the initial phase of our research. The model presented below illustrates the preliminary findings.

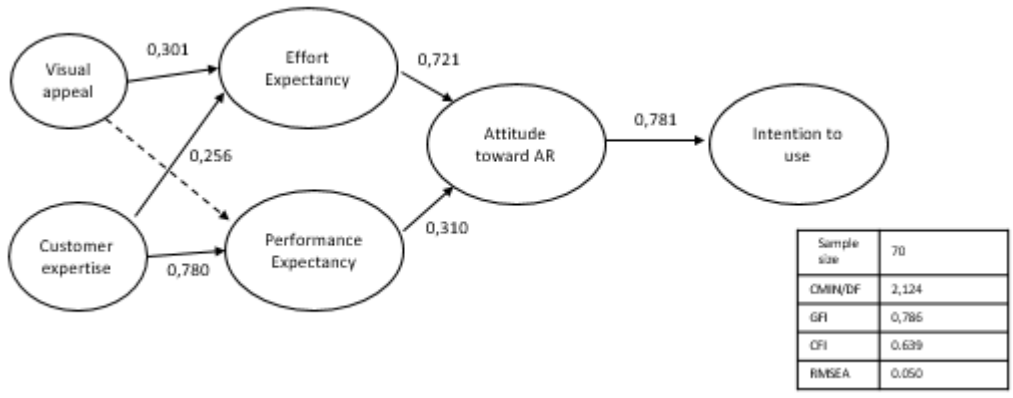


*Figure 2- Conceptual model with first results*

This initial phase of our study allowed us to test the model on a small sample of users. Consumer expertise significantly influences the expected performance of the application (0.780), paving the way for a new version of the application that would provide information of varying complexity based on the user's self-declared level. This would ensure that users receive information tailored to their knowledge of wine. The user experience has no impact on the expected effort (0.256), as does visual presentation (0.301), confirming that the use of augmented reality is perceived as straightforward. Attitude towards augmented reality is primarily influenced by its ease of use (0.721), at the expense of the expected application performance (0.310). Lastly, usage intention strongly depends on the attitude towards augmented reality (0.781), introducing a significant risk of polarization in usage. Customers who perceive augmented reality as a frivolous and uninteresting gadget are unlikely to use it, as the link between the expected result and attitude towards augmented reality is weak. We run the risk of immediate segmentation between users already convinced of the benefits of augmented reality and those who reject it without even trying it. In both cases, the decision is made before even testing the application!

**Conclusion**

This initial phase of a research project enabled us to establish the conceptual framework and test the application developed under experimental conditions. Several points should be considered for the continuation of our work. The conceptual framework could be enriched with new variables, notably the visual complexity of the interface (Miniukovich & De Angeli, 2014). This would allow for the introduction of a selection of information complexity displayed, thus optimizing the expected application performance. Regarding the sample, it is necessary to collect data from a larger sample, and testing on a French-speaking population would also be relevant to assess the suitability of such an application for consumers less accustomed to wine consumption. Finally, an extension of the project, currently under negotiation, would enable us to assess the relevance of this technology for promoting alcoholic beverages with low recognition, such as Mezcal, Rompope, Kahlua, and Pulque.

## References


Batat, W., & Hammedi, W. (2022). The extended reality technology (ERT) framework for designing customer and service experiences in phygital settings : A service research agenda. *Journal of Service Management*, *34*(1), 10-33. https://doi.org/10.1108/JOSM-08-2022-0289

Bourliataux-Lajoinie S, Rivière A. (2023), "Tourism M-services », in Elgar Encyclopedia of Services.

Carù, A., & Cova, B. (2003). Approche empirique de l'immersion dans l'expérience de consommation : Les opérations d'appropriation. *Recherche et Applications En Marketing (French Edition)*, *18*(2), 47-65. https://doi.org/10.1177/076737010301800203

Chen, J. V., Ruangsri, S., Ha, Q.-A., & Widjaja, A. E. (2022). An experimental study of consumers' impulse buying behaviour in augmented reality mobile shopping apps. *Behaviour & Information Technology*, *41*(15), 3360-3381. https://doi.org/10.1080/0144929X.2021.1987523

Chung, N., Han, H., & Joun, Y. (2015). Tourists' intention to visit a destination : The role of augmented reality (AR) application for a heritage site. *Computers in Human Behavior*, *50*, 588-599. https://doi.org/10.1016/j.chb.2015.02.068

Feenstra, F., & Glérant-Glikson, A. (2017). Identifier et comprendre les sources de valeur dans l'interaction avec les SSIT (Self-Service Information Technologies) en magasin. *Décisions Marketing*, *86*, 47-66. https://doi.org/10.7193/DM.086.47.66

Kang, S. (2014). Factors influencing intention of mobile application use. *International Journal of Mobile Communications*, *12*(4), 360-379. https://doi.org/10.1504/IJMC.2014.063653

Liu, Y., Li, H., & Hu, F. (2013). Website attributes in urging online impulse purchase : An empirical investigation on consumer perceptions. *Decision Support Systems*, *55*(3), 829-837. https://doi.org/10.1016/j.dss.2013.04.001

Madan, K., & Yadav, R. (2018). Understanding and predicting antecedents of mobile shopping adoption : A developing country perspective. *Asia Pacific Journal of Marketing and Logistics*, *30*(1), 139-162. https://doi.org/10.1108/APJML-02-2017-0023

Miniukovich, A., & De Angeli, A. (2014, May). Quantification of interface visual complexity. In Proceedings of the 2014 international working conference on advanced visual interfaces (pp. 153-160).

Parboteeah, D. V., Valacich, J. S., & Wells, J. D. (2009). The Influence of Website Characteristics on a Consumer's Urge to Buy Impulsively. *Information Systems Research*, *20*(1), 60-78. https://doi.org/10.1287/isre.1070.0157

Petty, R. E., & Cacioppo, J. T. (1986). The Elaboration Likelihood Model of Persuasion. In R. E. Petty & J. T. Cacioppo (Éds.), *Communication and Persuasion : Central and Peripheral Routes to Attitude Change* (p. 1-24). Springer. https://doi.org/10.1007/978-1-4612-4964-1_1

Qin, H., Peak, D. A., & Prybutok, V. (2021). A virtual market in your pocket : How does mobile augmented reality (MAR) influence consumer decision making? *Journal of Retailing and Consumer Services*, *58*, 102337. https://doi.org/10.1016/j.jretconser.2020.102337

Rivet, C., Reghem, J., & Fornerino, M. (2018). Explorer l'expérience de shopping dans un magasin phygital. *Décisions Marketing*, *91*(3), 45-60. https://doi.org/10.7193/DM.091.45.60

van der Heijden, H. (2003). Factors influencing the usage of websites : The case of a generic portal in The Netherlands. *Information & Management*, *40*(6), 541-549. https://doi.org/10.1016/S0378-7206(02)00079-4

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology : Toward a Unified View. *MIS Quarterly*, *27*(3), 425-478. https://doi.org/10.2307/30036540


**Appendix 1** - The phygital context of TTISS use


**Appendix 2** - The mobile apps screenshot.