

A Conceptual Framework for Apparel Firms' Adoption Intention of 3D Apparel Visualization Software: Moderating Effects of Organizational and Environmental Factors

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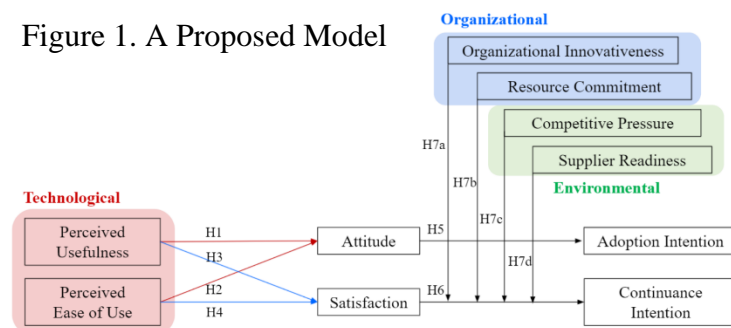
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Background: With the rise of virtual technology, there has been a gradual increase in the exploration of three-dimensional (3D) apparel visualization software in the long-term strategic planning by fashion brands and retailers with private labels. While 3D apparel visualization software has started to be adopted by leading innovative brands and retailers, they are at the beginning phase of the digitization journey and exploring the new technology for common utilization (Berg et al., 2017). Further, this new technology is rarely seen as fully integrated even in giant brands, and only some of the brands are utilizing it with efficient results (Jefferson et al., 2012). Besides, research thoroughly investigating influential factors and examining firms' adoption of 3D apparel visualization software is limited. Most studies on the adoption of 3D apparel visualization software have focused on understanding user experiences from individual levels such as general consumers and students (Baytar & Ashdown, 2015; Kim & Forsythe, 2008; Kim & LaBat, 2013; Park et al., 2011; Shim & Lee, 2011). That is, it is important to understand adoption intention from the firm's perspectives considering that fashion and apparel firms are the major clients of CAD/CAM software at this early examination stage. Filling the research gaps identified above, the purpose of this study was to develop a conceptual model to investigate significant factors that influence the adoption intention of 3D apparel visualization software in U.S. apparel firms and retailers and to address managerial implications for firm-wide initiatives.

Literature Review and Proposed Conceptual Model: At the organizational level, multidimensional factors influence innovation adoption (Rogers, 1995). As Technology Acceptance Model (TAM) (Davis, 1989) reflects the behavior of individuals regarding technological characteristics, both the internal and external characteristics of the organization were added by referring to Technology, Organization and Environment (TOE) model (Tornatzky & Fleischer, 1990) to explain how they denote both constraints and opportunities for technological innovation of an organization (Figure 1). Although 3D apparel visualization software can serve multiple advantages, industrial professionals pointed out that there are obstacles that serve as a hindrance to technology until the entire adaptation of the industry, including technology resistance, lack of skilled employees, high investment cost, difficulties in internal integration with existing systems, and immature technology (Papachristou, 2016).

Research Propositions: Internal and external circumstances can significantly influence the technological innovation of an organization. We expect that organizational and environmental

Figure 1. A Proposed Model



factors will moderate the positive relationship between industry professionals' attitudes toward the technology and the intention to adopt it for their business. Therefore, *P7*: The relationship between attitude and adoption intention will be stronger among companies with a higher degree of organizational innovativeness (Proposition 7a);

resource commitment (Proposition 7b); competitive pressure (Proposition 7c); readiness of supplier (Proposition 7d).

Organizational innovativeness: As an aspect of firm culture, openness to new ideas is central to the successful implementation of innovations (Rogers, 1995). An organization's capability to communicate, a push for change from top management, and individual innovativeness was found to impact employees' perception toward I.T. implementation and organizational change (Amoako-Gyampah, 2007; Walczuch et al., 2007). **Resource Commitment:** Lacouvou et al. (1995) proposed that costs and technical compatibility are the two main predictors of the initial use of information systems in the first application. Financial resources to adopt software include investment costs needed for acquiring, installing, maintaining, and updating the software, hiring, and training workers to upskill in the required area (Mageean, 2019). On the other hand, technological resources are concerned with the firm's technical skills and competencies about software usage and the level of sophistication of I.T. management in an organization (Jin et al., 2012; Yan & Fiorito, 2007). Accordingly, technology adoption intention may vary by the strength of an organization's identification with and involvement in resources to integrate new technology. **Competitive Pressure:** Competitive pressures denote a threat of losing a competitive advantage so that it pushes firms to pursue a competitive edge by adopting technologies (Grover, 1993; Oliveira & Martins, 2010). Several studies have shown that competitive pressure is a driver of technology adoption and influences an organization's awareness of technology in a particular industry (Bayo-Moriones & Lera-Lopez, 2007; Iacovou et al., 1995; Teo et al., 2006). **Readiness of Supplier:** Assessing the technological readiness of business partners and suppliers to adopt new technology is an essential prerequisite for keeping abreast of the current global supply chain. Lack of such an infrastructure and technological competence of partners and suppliers may restrict a firm's intention of technology usage and continuance intention (Armstrong & Sambamurthy, 1999; Bhattacharjee & Hikmet, 2008).

Conclusion: The proposed conceptual model attempted to take the organizational and environmental factors as the moderating variables to investigate influential factors and examine the firm's adoption of 3D apparel visualization software. This study can add to the literature by extending the technology acceptance model to explain how multidimensional factors are related to adopting and implementing decisions for firm-wide initiatives.

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