IIAI Open Conference Publication Series
IIAI Letters on Business and Decision Science
Vol. 004, LBDS257
DOI: https://doi.org/10.52731/lbds.v004.257

# Investigating Smart Retail Stores Adoption: An MOA Theoretical Perspective

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## Abstract

This study employs the Motivation, Opportunity, and Ability (MOA) theory to explore factors influencing consumer adoption of smart retail stores in Taiwan. Analyzing responses from 829 potential users, it identifies significant positive effects of motivation, opportunity, and ability on consumer attitudes, which directly enhance adoption intentions. Opportunity also serves as a moderator, amplifying the impact of motivation on attitudes, highlighting its critical role in smart retail adoption strategies. This research substantively supports the adoption of smart retail stores, both theoretically and empirically, filling a notable gap in Taiwan's academic exploration of smart retailing. It provides a robust empirical foundation for promoting smart retail adoption both locally and globally, offering valuable insights for the retail industry, policymakers, and academia.

*Keywords:* Smart retail stores, Motivation, Opportunity, Ability, MOA theory.

## 1 Introduction

According to a 2022 research report by Business Wire (BW), the global smart retail market size is expected to reach $39.6 billion by 2024, with a compound annual growth rate (CAGR) of 22.4% by 2027. In recent years, the retail sector has witnessed significant transformations with the rise of smart retail stores, which differ markedly from traditional retail models. This shift has garnered considerable attention in academic circles, leading to a wealth of studies on the interplay between smart retail environments, self-service technology (SST), and consumer behavior. These studies extensively investigate various facets such as technological readiness, social influence, consumer self-efficacy, and the integration of augmented reality (AR) interactive technologies. Additionally, they explore the acceptance of self-service technologies and their impact on customer satisfaction. The insights gained from this body of research are crucial for retailers looking to effectively incorporate technology into their service offerings, thereby enhancing the smart retail ecosystem.

This study examines the adoption of smart retail stores using the Motivation, Opportunity, and Ability (MOA) theory [1] as a framework to understand the key factors that drive consumer intentions. Unlike models focusing solely on direct user-technology interactions, the MOA theory incorporates external factors and acknowledges the intricate relationship between technology, environment, and individual characteristics [2]. This broader perspective is essential for analyzing real-world usage and makes the MOA theory particularly suitable for this research. By ap-

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plying the MOA framework, the study not only enhances our understanding of consumer behavior in smart retail contexts but also provides valuable insights and practical recommendations for both academia and the retail industry. This approach promises to foster innovation in research methodologies and guide the development and management of smart retail operations.

## 2 Theoretical Background

**Smart retail stores** use intelligent self-service technologies (SSTs) to replace traditional human-operated services. The goal of employing these technologies is to streamline the purchasing and delivery processes, reducing both time and costs, and to enhance the convenience and standardization of services. New technologies in smart retail stores include biometric systems, mobile payment tools, and sensors such as RFID tags and QR codes.

The **MOA (Motivation, Opportunity, Ability)** framework comprises: (1) Motivation: The psychological drivers that prompt individuals to act, influenced by internal emotions that shape decisions and behaviors [3]. For the motivation dimension, the study identifies five sub-dimensions: security, perceived usefulness, service convenience, pleasure, and challenge. (2) Opportunity: External factors that either facilitate or inhibit behaviors, affecting consumer readiness to adopt new technologies [4]. In the opportunity dimension, measurements include perceived retailer support, alternative attractiveness, and both normative and informational social influences. (3) Ability: Ability refers to the extent to which an individual has the necessary knowledge and resources to achieve desired outcomes [5]. For the ability dimension, the sub-dimensions include self-efficacy, personal innovativeness, and knowledge.

## 3 Research Methodology

This study investigates the factors that shape Taiwanese consumers' attitudes and intentions towards adopting smart retail stores, specifically through the lenses of motivation, opportunity, and ability. The MOA theory, previously underutilized in smart retail research, serves as the foundational framework here, offering a broader theoretical perspective. The research aims to assess and validate key factors influencing the adoption of smart retail in Taiwan and explores the moderating effects of the opportunity on these relationships. The research model is shown in Figure 1.

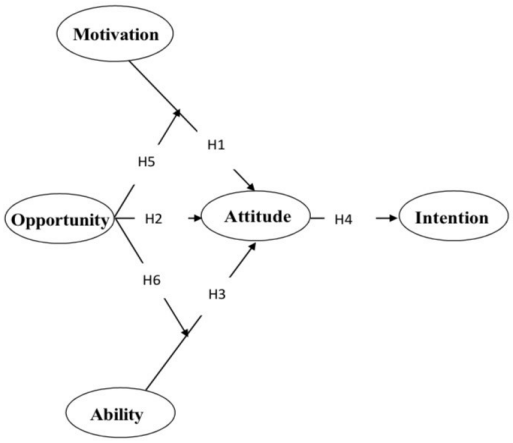


Figure 1: Research model

This study proposes the following hypotheses:

H1: Higher consumer motivation correlates with a more positive attitude towards adopting smart retail stores.

H2: More favorable opportunities in the consumer environment lead to a more positive attitude towards smart retail adoption.

H3: Greater consumer ability is associated with a more positive attitude towards adopting smart retail stores.

H4: A more positive attitude towards smart retail stores increases the intention to adopt.

H5: Opportunities in the consumer environment positively moderate the link between motivation and attitude towards adopting smart retail stores.

H6: Opportunities in the consumer environment positively moderate the connection between ability and attitude towards adopting smart retail stores.

In this study, all latent variables are measured through multiple observed variables. Respondents indicate their level of agreement with the statements on a seven-point Likert scale, which measures the degree of agreement with each item. For this study, 1,200 surveys were distributed, and intensive phone follow-ups were conducted to improve response rates. Ultimately, 878 questionnaires were collected. After excluding 49 invalid samples, 829 valid responses remained, yielding a response rate of 69.1%.

## 4 Data Analysis and Results

This study utilized SmartPLS 3.2.8, developed by Ringle et al. (2015) [6], to perform the data analysis, which was conducted in two stages. The first stage assessed the reliability and validity of the measurement model, while the second stage tested the path coefficients and evaluated the predictive capability of the structural model.

In the measurement model analysis, this study used reliability and convergent validity criteria proposed by Hair et al. (1998) [7]: Individual Item Reliability: Each observed variable's factor loadings exceeded the recommended threshold of 0.5, indicating good reliability. Composite Reliability (CR) and Cronbach's α: Values ranged from 0.7 to 0.939, surpassing the threshold of 0.7, reflecting high internal consistency. Average Variance Extracted (AVE): Values ranged from 0.581 to 0.820, all above the 0.5 benchmark, confirming strong convergent validity. For discriminant validity, the square roots of the AVE for each latent variable, ranging from 0.762 to 0.906, were greater than the correlations with other variables, ensuring that the latent variables were distinct and well-defined.

In the structural model analysis, this study utilized SmartPLS 3.2.8 to examine the causal relationships between latent variables, using the $R^2$ value to assess the model's explanatory power [8]. The results indicated that five of the six proposed hypotheses demonstrated significant path relationships. However, Hypothesis H6 did not achieve statistical significance at the 0.05 level.

## 5 Discussion

This study applies the Motivation-Opportunity-Ability (MOA) theory to examine consumer attitudes and intentions toward adopting smart retail stores in Taiwan. Results show that the dimensions of opportunity, ability, and motivation significantly influence consumer adoption attitudes,

with opportunity having the strongest impact (β=0.462), followed by ability (β=0.248) and motivation (β=0.152). This indicates that consumer acceptance is more influenced by external environments and personal abilities than intrinsic motivation.

The study found that opportunity significantly moderates the relationship between motivation and adoption attitude (β=0.105), but its moderating effect between ability and adoption attitude is not significant (β=0.018). This suggests that opportunity and ability may compensate for each other; for instance, sufficient external opportunities can offset limited personal ability, encouraging positive attitudes towards smart retail technology. Conversely, strong personal ability can lead to a positive adoption attitude even in less supportive external environments. Additionally, an individual's ability may not be heavily influenced by external opportunities, suggesting that familiarity and skills with smart retail technology are often independent of the external environment. Thus, even with supportive opportunities, if an individual lacks necessary skills, these opportunities might not significantly enhance their adoption attitude.

This study also explored the mediating role of usage attitude in the relationship between motivation, opportunity, ability, and consumer adoption intention for smart retail stores. The indirect effects of the three constructs through usage attitude were found to be significant: motivation at 0.116, opportunity at 0.352, and ability at 0.189. The direct effects on adoption intention were also significant, with motivation at 0.130, opportunity at 0.124, and ability at 0.106. These findings suggest that usage attitude partially mediates the relationships, indicating that motivation, opportunity, and ability not only influence adoption intention indirectly by affecting usage attitude but also have a direct impact. Thus, enhancing consumer motivation, opportunity, and ability is crucial, but improving usage attitude is equally important for fostering consumer adoption of smart retail stores. Usage attitude significantly bridges the gap between these constructs and adoption intention, highlighting its critical mediating role.

## 5.1 Theoretical Implications

This study applies the Motivation, Opportunity, and Ability (MOA) theory to smart retail stores, making three significant contributions to consumer behavior theory:

(1) Innovative Use of MOA Theory: Traditionally utilized across various domains, MOA theory's application to smart retail is academically novel. This expands the theory's utility and provides fresh insights into consumer behavior within smart retail contexts, affirming the theory's relevance as suggested by Bollen and Diamantopoulos (2017) [9].

(2) Comprehensive Analysis of Influencing Factors: The study reviews and synthesizes formative measurement indicators for motivation, opportunity, and ability, aligning with Jarvis et al. (2003)'s criteria [10]. These indicators are critical for understanding and assessing their impact on consumer adoption attitudes and intentions in smart retail stores.

(3) Promotion of Interdisciplinary Research: By merging insights from consumer behavior, psychology, marketing, and technology innovation, the study fosters interdisciplinary research and collaboration, validating MOA theory's application in analyzing consumer behavior in smart retail settings and enriching existing consumer behavior theories.

### 5.2 Managerial Implications

This study delineates management implications for smart retail stores based on the Motivation, Opportunity, and Ability (MOA) framework, highlighting three key dimensions:

(1) Motivational Implications: Retailers should enhance consumer experience by ensuring safety, convenience, and engagement. This involves implementing robust security measures, enhancing service utility, and innovating within the service design to maintain consumer interest. For example, integrating advanced technologies and immersive shopping experiences like virtual reality can help demystify new technologies and make them more accessible, encouraging consumer adoption.

(2) Opportunity Implications: This dimension underscores the importance of social and market environment influences on retail strategy. Retailers need to engage consumers through supportive interactions and influential social media activities, which can include collaborations with well-known influencers to showcase the conveniences and advantages of smart retail. Such strategies can effectively boost consumer interest and market acceptance.

(3) Ability Implications: Focusing on consumer capabilities, retailers should offer personalized shopping solutions that cater to different knowledge and innovation levels. Enhancements like augmented reality shopping guides and AI shopping assistants can simplify the shopping process, increase self-efficacy, and make the experience more enjoyable and efficient.

Additionally, integrating cutting-edge technologies and managing customer relationships effectively are crucial for maintaining relevance and enhancing consumer satisfaction in the evolving smart retail landscape. These strategies should collectively foster a deeper connection with consumers, driving loyalty and advancing the development of smart retail environments.

Undoubtedly, the future of smart retailing will be driven by IT-related technologies like cloud computing, IoT, AI, VR, AR, and other tech solutions. Data plays a crucial role in successfully transforming the traditional retail industry. However, the core value of the retail sector remains in understanding customer psychology. All innovations should center around consumers, integrating their needs and preferences into the shopping experience. This consumer-centric approach is essential for the sustainable operation of smart retail stores and the digital transformation of businesses [11].

## 6 Limitations and Future Research

This study offers initial insights into smart retail but has several limitations. Primarily, since the sample is drawn from Taiwan where smart stores are experimental, the findings may not generalize globally due to regional cultural, economic, and social influences. Additionally, the use of a cross-sectional survey limits the ability to track long-term shifts in consumer acceptance. Also, the reliance on quantitative data might not fully explore the deeper emotional and cognitive reactions of consumers to smart retail.

Future research could expand geographically to assess how various cultural and economic contexts influence consumer acceptance of smart retail. Employing a longitudinal approach

would help understand how consumer attitudes evolve over time. Incorporating qualitative methods like interviews or case studies would offer richer insights into consumer perceptions and resistance to smart retail. Research should also consider the impact of emerging technologies like augmented and virtual reality in retail settings and examine behavioral differences across various smart retail models (e.g., unmanned vs. serviced stores). Integrating the MOA theory with models like the Technology Acceptance Model or Diffusion of Innovations Theory could provide a more nuanced analysis of consumer behaviors towards smart retail. These recommendations aim to deepen the understanding of smart retail and assist retailers in enhancing innovation and adoption strategies.

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