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# The Impact of Unmanned Store Characteristics on Stickiness Intention through Consumer Value

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***Abstract***

*Despite the growth of unmanned stores alongside innovative technological advancements, research on consumer value and purchase intentions regarding unmanned stores remains relatively scarce. Therefore, this study aimed to investigate the impact of unmanned store characteristics on stickiness intentions based on consumer value. An online survey was conducted from October 10th to October 17th, 2023, targeting 350 individuals who had made purchases at unmanned stores, and a total of 319 responses were used for analysis. The research findings indicate that the characteristics of unmanned stores responsiveness, tangibility, and reliability positively influence consumers' experiential value, subsequently increasing stickiness intentions. Moreover, Tangibility positively affected economic value, while reliability had a positive impact on psychological value. Consumer value was found to significantly impact stickiness intentions. Confirming the influence of each unmanned store characteristic through various consumer values on stickiness intentions, this study suggests that strategic planning to enhance consumer stickiness intentions is feasible. It also underscores the necessity of store operational strategies that consider the significance of consumer value.*

***Keywords:*** *Unmanned Store Characteristics, Consumer Value, Stickiness Intentions*

## INTRODUCTION

The retail industry has experienced significant environmental changes such as steep rises in labor costs and raw material prices, with the trend of automation taking center stage. The shift towards contactless culture, triggered by past infectious disease outbreaks like the social distancing measures, has now become a culture widely accepted by consumers. The trend of automation within stores has spread from food-related businesses like cafes, restaurants, salad bars to everyday life stores such as clothing outlets, health clubs, and cosmetic stores (Jung & Park, 2020).

Particularly, unmanned stores have rapidly evolved as a more convenient and trendy culture among the younger generation, alongside the proliferation and integration of IT technologies. The world's first unmanned store emerged in Viken, Sweden, in 2016, operating as a convenience store selling various necessities, issuing bills on a monthly basis to its users. Following this, in January 2018, the world's largest logistics company, 'Amazon,' introduced 'Amazon Go,' a new unmanned grocery store, becoming globally renowned and a pioneering case of unmanned stores (Kim, 2017). China, following the United States' footsteps, showcases prominent examples of unmanned stores facilitated by Alibaba Group, such as BingoBox, Tao Cafe, and Hema Fresh (Jung & Park, 2020).

Furthermore, in South Korea, unmanned stores are easily observable with formats like GS25 unmanned convenience stores, Seven Eleven Signature, Innisfree Self-Store, where there are no attendants, and consumers are responsible for self-checkouts. Additionally, there are representative domestic examples like Emart24, employing a system known as 'Just Walk Out,' enabling unmanned and automated billing processes (Shin, 2022). The hybrid form of unmanned stores, tailored to the domestic context, differentiates its operation during the day and night, employing incentivized systems when consumers are abundant during the day and unmanned systems during relatively quieter nights (Park & Lee, 2021). This specialized hybrid form of unmanned stores in the domestic market has seen a rapid growth, starting with around 500 stores in 2020 and expanding to over 2,000 stores by 2022.

Unmanned stores are favored by store owners due to the ability to reduce operational costs and offer customers differentiated experiences. Moreover, operational systems are advancing in tandem with innovative IT systems.

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Particularly in South Korea, there is a growing interest in unmanned ice cream stores, unmanned stationery stores, and other unmanned startup ventures (Woo et al., 2022). However, despite the increasing number of startups adopting unmanned stores as a new business model, research on whether these stores properly satisfy consumer needs and, ultimately, on the stickiness intentions of consumers regarding the increase in visits to unmanned stores remains very scarce.

Therefore, this study aims to delve deeply into the characteristics of unmanned stores and examine how these characteristics, mediated through consumer value, influence stickiness intentions. To achieve this research goal, the study focused on consumers who utilize unmanned stores in the domestic market and aimed to conduct an in-depth analysis of how the characteristics of the newly growing business model of unmanned stores impact consumer store stickiness intentions through consumer values. While preceding studies have primarily examined the developmental processes, current status, user intentions, environmental characteristics, and primary consumer age groups regarding unmanned stores, this research centered on various consumer values and customer stickiness intentions. Thus, this study intends to aid in understanding how consumer stickiness intentions are ultimately formed by classifying the characteristics of unmanned stores selected from previous studies, verifying the influence of each characteristic on consumer value, and, ultimately, comprehending the formation of consumer stickiness intentions.

## THEORETICAL BACKGROUND

### Characteristics of Unmanned Stores

An unmanned store refers to an automated system store that sells products without human involvement, replacing traditional stores operated by people. Previous studies have indicated that unmanned stores are capable of providing convenient services to users at low costs, promoting efficiency, reducing labor expenses, and cutting operational costs (Jung & Park, 2020). Before delving into the characteristics of unmanned stores, let's explore some international examples.

1) United States

The most representative example in the United States is 'Amazon Go,' introduced in early 2018 and operated by Amazon, the world's largest logistics company. Users enter the store, select desired items, and pay automatically through their mobile app without the need for traditional checkout. The automatic payment technology detects when items are taken off shelves and seamlessly charges the user's account. As consumers leave the store, receipts are generated via the mobile app, eliminating the need for checkout counters. The initial version of Amazon Go was set up for Amazon headquarters employees in 2016 but expanded significantly to the general public after addressing technological issues (Hsu, 2022). Its main technological advancement is eliminating the need for consumers to wait at checkout.

2) China

Unmanned stores in China go a step further compared to those in the US by incorporating facial recognition for consumers. Smart convenience store franchises like SAEWay, SAEOMY, EasyHouses, 24 AIGO, EasyGo, and TakeGo were introduced in Shanghai, with Chongqing Winyou TenSa Information Technology Co., Ltd. launching the unmanned convenience store 'Yi Chi San Di En' in 2017, employing facial recognition and AI technology to produce and utilize big data. However, Yi Chi San Di En requires consumers to authenticate their identity through mobile payment systems upon leaving the store after selecting products. Consumers receive a QR code immediately after payment, which they need to scan at the store exit. Multinational companies like Alibaba also introduced unmanned experience stores in 2018.

3) Japan

Unmanned stores in Japan have not been introduced as extensively. Some variations of smart stores operate with a modified form of unmanned systems. For instance, staff plays a role in verifying customer age for specific products or restocking inventory while utilizing unmanned systems for checkout (Lee & Lee, 2018). Therefore, Japanese unmanned stores can't be deemed entirely unmanned like those in the US or China. Fukuoka's large-

scale mart 'Trial' employs CCTV and cameras to observe customer movements and employs unmanned technology to automatically charge customers when they press the payment button on terminals after selecting items. If unrecognized items are taken out, an alarm sounds, allowing inventory tracking and theft prevention. However, as resident staff handle alarm response and restocking, they cannot be considered fully unmanned. Other examples include the SPA brand 'Uniqlo,' which introduced an RFID (Radio-Frequency Identification) system in 2019. Customers recognize items on checkout counters, and automatic payments are made (Park & Jeong, 2021).

4) South Korea

South Korea's first unmanned store, E-Mart 24 Kimpo Data Center Branch, opened in 2019, managing all processes from entry to payment without human intervention. SSG PAY, a mobile app, facilitates entry and payment, selling approximately 790 groceries and daily necessities. However, products requiring adult verification, such as tobacco and liquor, are not sold (Lee & Park, 2021). Notably, the store operates entirely unmanned with 31 cameras inside, making it the most complete form of an unmanned store. Additionally, some convenience stores operate as unmanned stores only at night, relying on consumers' honesty to recognize product barcodes and make card payments.

Unmanned stores are operational worldwide. Integrated with cutting-edge technologies like Artificial Intelligence (AI), IoT, and Big Data, unmanned stores encompass functions from automated payments to user recognition and product tracking. Previous academic papers mainly discuss how advanced technologies are effectively integrated into unmanned stores for efficient operation. Furthermore, discussions on the impact of unmanned stores on the economy and society, potential changes and growth if technology advances, are actively published. To predict and understand the future of business activities in modern consumer society, understanding the characteristics, technologies, and market trends of unmanned stores is essential. Notably, recent introductions and advancements in unmanned stores are seen to offer diverse purchasing experiences to consumers. Previous studies highlight that unmanned stores emphasize minimal personnel use and efficient operation, emphasizing their strengths. Systems integrated into unmanned stores, such as beacons, IoT, and AI, store and utilize data about consumer purchase histories and paths, offering personalized shopping experiences. These systemic characteristics enable businesses to understand consumer shopping behaviors, provide more consumer-friendly marketing, and effectively utilize related data to operate stores more efficiently.

Studies on unmanned store research mainly focus on the technological characteristics, effects, limitations, and improvement points of unmanned stores. As unmanned stores operate without resident employees, ensuring their safety, efficiency, and enhancing consumer satisfaction remains a challenge. Continuous publication of future-oriented studies related to unmanned stores, including topics like personalized services for consumers, innovation technology development and integration, and sustainable management (ESG), is ongoing.

The research topic indicates that unmanned stores aim not merely for labor cost savings but also to enhance sales and purchasing experiences between companies and consumers, proposing more futuristic unmanned stores. This contributes to new approaches in consumer culture and drives commercial environment development. Studies analyzing store characteristics divide their analyses into technology diversity, utility, safety, diversity of service quality, and operational economics and efficiency, paving the way for the development direction and expansion potential of unmanned stores as cornerstones.

Moreover, reviewing the summarized characteristics of unmanned stores from previous research reveals that they reflect the latest retail forms combining various innovative technologies and unmanned operation methods. The mentioned characteristics mainly include the development history of unmanned stores, major consumer demographics, environmental features of stores, and consumer behaviors. Specifically breaking down these characteristics, they can be categorized into responsiveness, tangibility, accessibility, reliability, convenience, and security:

Responsiveness refers to the store's ability to adapt accurately, quickly, and appropriately to consumer behaviors and demands, considering that responsiveness exists when consumers judge they received appropriate services similar to manned stores.

Tangibility means that the products or services provided in the store can be operated in a substantial and flexible manner, as if there were staff members present.

Accessibility denotes the location of unmanned stores for consumers and easy access to services within the store.

Reliability indicates the continuous provision of store services, determining how much consumers trust these services.

Convenience evaluates how consumer-friendly, easy, and simple the services are during their usage of unmanned stores.

Lastly, security refers to the protection of consumer personal information and purchased items. These six characteristics have some inferred impact on consumer value, yet further research is needed.

## Consumer Value

Consumer value refers to what consumers prioritize when choosing a product or service. It encompasses experiential value, economic value, and psychological value. Firstly, experiential value denotes the convenience or satisfaction that consumers experience when using a product or service. Prior studies have associated experiential value with user experience, the functionality of products, and the quality of services (Lee et al., 2011). Experiential value can imprint the brand itself, including the products and services offered by a company, on consumers, allowing an understanding of their dissatisfaction or desires, thus highlighting its significance. Secondly, economic value is the value consumers experience in relation to the price of a product or service. It involves experiencing high-quality service at an appropriate price or feeling satisfaction regarding a product when considering its price. Previous research has explored economic value in relation to the mechanisms that determine pricing, as well as consumer perceptions of price and its utility. Lastly, psychological value signifies the symbolism of purchasing a particular brand's product and relates to the brand's social recognition, self-image, and brand image. Previous studies that categorized consumer value into experiential, economic, and psychological values have shown a high association with consumers' purchase intentions, actual purchase behavior or preferences, and purchase satisfaction (Choi & Lee, 2018).

Consumer value is also being interpreted in the context of modern issues such as AI environments, advanced digital environments, social network services, and sustainable management. Therefore, in the unique environment of unmanned stores, in-depth research into the definition and measurement methods of consumer value is necessary to understand the influencing factors. These findings can facilitate the development of effective operational strategies and marketing goals for unmanned stores. Consequently, such research outcomes can provide crucial knowledge for businesses to plan business strategies that align appropriately with consumer needs. This allows unmanned store companies to secure competitiveness, continue operating in the market, and effectively meet consumer demands.

## Stickiness Intention

Stickiness intention refers to consumers' positive interest and perception towards a particular brand, service, or product, further indicating a higher association with consumer intent (Park et al., 2003). It's a term primarily introduced in consumer behavior, marketing, or psychology. stickiness intention is closely linked to customer loyalty, brand loyalty, and brand affection, signifying affection and dedication towards a company's products or services (Lee et al., 2017). Previous studies on stickiness intention have investigated its correlation with consumer variables such as attitudes, perceptions, and satisfaction, and explored how stickiness intention influenced actual purchase intent or buying behavior.

Prior research has introduced various research methodologies and theoretical models on accurately measuring and interpreting stickiness intention. Identifying consumer behavioral variables associated with stickiness intention and analyzing their correlations are essential in understanding and predicting consumer stickiness intention. With recent advancements where stores are utilizing digital marketing and evolving into new forms like unmanned stores using innovative AI-based systems, research on stickiness intention with modernized

stores has gradually been conducted. Based on these outcomes, businesses can utilize the results of this study as a strategy to enhance consumer understanding and interest in unmanned stores and develop marketing strategies and systems accordingly.

## RESEARCH METHOD

### Sample Design and Measurement Tools

This study aimed to identify the correlation between the characteristics of unmanned stores and the impact on consumer values leading to stickiness intentions. Surveys were conducted among individuals who had made purchases at unmanned stores at least once. Data collection took place from October 10th to October 17th, 2023. Researchers explained the purpose and content of the study through an online survey and obtained consent, collecting responses from 350 users. Ultimately, 350 questionnaires were gathered, and after excluding 31 incomplete or unreliable questionnaires, a total of 319 questionnaires were used for the final analysis.

This study, as previously mentioned, organized the measurement items based on preceding research related to the characteristics of unmanned stores, consumer values, and stickiness intentions. Adjustments were made to the evaluation items presented in previous studies to suit the context according to the research objectives. The evaluation criteria were structured using a 7-point Likert scale as follows.

**Table 1. list of measurement**

| Factor | Measurement Items | Research |
|---|---|---|
| Responsiveness | 1. The unmanned system at the store I use tends to respond promptly to user reactions.<br>2. The unmanned system at the store I use seems to make an effort to assist users.<br>3. The unmanned system at the store I use appears to respond quickly to user requests.<br>4. In case of an emergency, the store manager at the store I use can arrive on the scene quickly. | Lee& Kim(1999), Lee &Park(2022) |
| Tangibility | 5. The store I use is equipped with facilities suitable for an unmanned store.<br>6. The store I use is well-maintained and suitable for an unmanned store.<br>7. The unmanned store I use has modern facilities.<br>8. The shelf arrangement and product categorization and display at the store I use are regular and good. | |
| Accessibility | 9. The unmanned store I use is easy to locate.<br>10. The unmanned store I use is close to my residence.<br>11. The traffic around the unmanned store I use is convenient.<br>12. The parking facilities around the unmanned store I use are convenient. | |
| Reliability | 13. The store I use operates with an unmanned system that is reliable and appropriate for the current era.<br>14. The unmanned store I use is trustworthy.<br>15. The unmanned store I use is stable and reliable.<br>16. The unmanned store I use tends to be accurate in billing during payment. | Lee& Kim(1999), Lee &Park(2022) |
| Convenience | 17. The unmanned store I use is open 24 hours, easily accessible to anyone at any time.<br>18. I believe the unmanned store I use can gain greater economic benefits compared to other stores.<br>19. It is more convenient to browse at the unmanned store I use due to the absence of onlookers and its larger space compared to other stores.<br>20. Using the unmanned store I frequent seems to shorten the shopping and payment time compared to other stores. | |
| Security | 21. I believe the unmanned store I use can guarantee the privacy of its users.<br>22. I believe the unmanned store I use can thoroughly protect the personal information of its users.<br>23. I think that the system of the unmanned store I use has a low incidence of calculation or other errors.<br>24. I believe that the unmanned store I use ensures the safety of its users at night. | |
| Experiential value | 25. I feel that the unmanned store I use is special compared to other stores.<br>26. I find using the unmanned store I frequent to be fresh and fun.<br>27. The technical elements (automatic payment, product recognition, etc.) of the unmanned store I use seem to enhance the shopping experience. | Choi&Lee(2018), Hwang(2014) |
| Economic value | 28. I think that the product prices at the unmanned store I use are more reasonable compared to other stores.<br>29. I find the promotions/discounts at the unmanned store I use more satisfying than those at other stores. | Choi&Lee(2018), Hwang(2014) |

| | | |
|---|---|---|
| | 30. I feel that using the unmanned store I frequent offers more economic benefits compared to other stores. | |
| Psychological value | 31. Using the unmanned store I frequent feels convenient.<br>32. The unmanned store I use allows for a stress-free enjoyment of the store.<br>33. The overall experience of using the unmanned store I frequent feels convenient. | Choi&Lee(2018) |
| Stickiness Intention | 34. I am inclined to recommend the unmanned store I use to others.<br>35. I tend to use the unmanned store I frequent whenever possible.<br>36. I make an effort to regularly visit the unmanned store I frequent.<br>37. Compared to other stores, I wish to continue using the unmanned store I frequent. | Park et al.(2005), Lee et al.(2017) |

## Analysis Method

The objective of this study is to investigate the relationships between various latent variables and their influence on specific outcomes. To accomplish this, covariance structure analysis was performed. This method was chosen because it provides a robust tool for analyzing complex causal relationships among latent variables that incorporate measured values, without relying on the manner of individually analyzing relationships among the variables proposed by each hypothesis.

For analysis, widely used statistical software, SPSS, and AMOS were employed. SPSS (Statistical Package for the Social Sciences) is a software package that offers extensive techniques and inferential statistical analysis tools for data analysis. Additionally, AMOS (Analysis of Moment Structures) is structural equation modeling software that provides advanced modeling and analysis functionalities, including covariance structure analysis.

By utilizing covariance structure analysis and the selected software tools, a comprehensive investigation was conducted into the relationships between latent variables and the influence on research outcomes.

## Hypothesis Development

1) The Relationship between the Characteristics of Unmanned Stores and Consumer Value

Unmanned stores, based on the innovative advancement of technology, provide various characteristics such as responsiveness, tangibility, accessibility, reliability, convenience, and security. These characteristics influence consumer value in terms of experiential, economic, and psychological aspects (Kim & Jung, 2021). Examining the impact of each characteristic of unmanned stores on consumer value, firstly, the responsiveness of unmanned stores refers to the ability to respond quickly and appropriately to customer needs and actions. This is closely associated with the three main elements of consumer value: experiential, economic, and psychological value.

First, in terms of the experiential value for consumers, responsiveness ensures immediate provision of goods or services or responding to customer requests (Dong et al., 2014). This allows consumers to have a smooth and comfortable shopping experience in unmanned stores, similar to those with staff, thereby enhancing their satisfaction and increasing experiential value. Next, in terms of economic value for consumers, responsiveness helps in saving time by providing efficient services (Park et al., 2011). Time saving, seen as an economic benefit, allows consumers to feel that their time in unmanned stores is spent efficiently and valuably. Moreover, in terms of psychological value for consumers, the more accurate and faster the service, the higher the psychological comfort and trust experienced by consumers (Park et al., 2011). Therefore, consumers feel immediate satisfaction with the services, leading to a positive perception of the unmanned store and an increase in psychological value. In summary, the responsiveness of unmanned stores positively influences the experiential, economic, and psychological values of consumers, fostering a proactive attitude towards purchasing intentions and store visits.

Secondly, the tangibility of unmanned stores refers to the diversity and flexibility of products or services, which again relates to the experiential, economic, and psychological values of consumers (Na & Kim, 2022). In terms of experiential value, tangibility provides consumers with opportunities to experience a range of products or

services. This allows consumers to make choices that suit their preferences and needs, leading to a more personalized and enriched shopping experience in unmanned stores. This experience enhances consumer satisfaction, thus elevating experiential value. Economically, tangibility allows consumers to recognize a diverse range of products within their budget, thereby increasing economic benefits (Lee & Kim, 2011). The diversity enhances the value for money, benefiting the perception of unmanned stores. Psychologically, tangibility helps consumers to find products or services that fit their lifestyle or ideals. The breadth of choices elevates consumers' self-esteem and psychological satisfaction, fostering a positive mindset and perception of the unmanned store. Therefore, the tangibility of unmanned stores leads to an enhancement in experiential, economic, and psychological values, encouraging positive experiences and loyalty towards the store.

Thirdly, the accessibility of unmanned stores denotes how easily consumers can access the store or its products and services, which is again linked to the experiential, economic, and psychological values (Kim & Jung, 2021). In terms of experiential value, accessibility enables consumers to shop efficiently and conveniently, contributing to positive experiences. If the unmanned store and its products and services are easily accessible without place or time restrictions, this increases the experiential value. Economically, accessibility saves time and effort for consumers in finding products, thus providing an opportunity to save costs and time (Kang et al., 2018). Psychologically, high accessibility reduces shopping stress and enhances convenience, reducing the psychological distance for revisiting the store and increasing loyalty and trust in the store. Thus, accessibility in unmanned stores influences all three-consumer values experiential, economic, and psychological and promotes a positive evaluation towards revisiting the store.

Fourthly, the reliability of unmanned stores concerns the trustworthiness and stability of the provided products, services, or related systems (Jeong & Song, 2022). Reliability affects the experiential, economic, and psychological values of consumers. In terms of experiential value, reliability ensures that the systems within the store are stable, allowing consumers to confidently input purchase information and make payments. If consumers perceive the services as reliable, with accurate product information and consistently stable system operations, this enhances the shopping experience and increases experiential value. Economically, reliability ensures that products are appropriately recognized and paid for, allowing consumers to purchase without economic loss, thus enhancing their value assessment (Kim, 2023). Psychologically, reliability increases trust and comfort in the store, products, and services. This trust elevates the consumer's psychological value, positively affecting the perception of the store's brand. Therefore, reliability enhances consumer satisfaction and positively influences the brand evaluation.

Fifthly, the convenience of unmanned stores is perceived by consumers in terms of ease and comfort in visiting and using the store, and it is related to experiential, economic, and psychological values (Kang et al., 2018). In terms of experiential value, convenience allows consumers to find and purchase products quickly and easily, enhancing the positive shopping experience. Consumers experience increased experiential value through innovative technology, intuitive interfaces, easy purchasing processes, and simple payment systems. Economically, convenience saves physical and temporal costs for consumers (Kim, 2023). The convenience and speed of unmanned stores save time, which can be translated into economic value. Psychologically, convenience reduces the burden and stress of interacting with staff, thus increasing consumer trust and satisfaction and positively influencing psychological value. This positive experience changes consumers' loyalty and attitude towards the store brand positively. Therefore, the convenience of unmanned stores comprehensively increases experiential, economic, and psychological values, enhancing consumer satisfaction and preference for the brand (Na & Kim, 2022).

Lastly, the security of unmanned stores ensures the protection of consumer information, such as personal and payment details, enabling safe transactions of products and services (Jeong & Song, 2022). In terms of experiential value, security allows consumers to feel safe while using the store. For instance, if the payment process in the store securely processes payments and protects personal information, consumers can have a comfortable shopping experience without the risk of personal information exposure (Lee & Kim, 2011). This elevates the overall experience and increases experiential value. Economically, security protects consumer financial information and electronic assets. Understanding and recognizing a secure payment system reduces concerns about economic loss during purchases, thus raising the perceived economic value of the store.

Psychologically, security is a crucial element in increasing consumer trust. Thus, feeling secure in transactions and trust in the products and services elevates the convenience and image of the store, thereby increasing psychological value. Therefore, the security of unmanned stores is highly related to experiential, economic, and psychological values, ultimately influencing consumer satisfaction and purchase intentions.

Based on these considerations, the following hypotheses are proposed:

Hypothesis 1-1: The responsiveness of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 1-2: The tangibility of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 1-3: The accessibility of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 1-4: The reliability of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 1-5: The convenience of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 1-6: The security of unmanned stores will have a positive (+) impact on the experiential value

Hypothesis 2-1: The responsiveness of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 2-2: The tangibility of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 2-3: The accessibility of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 2-4: The reliability of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 2-5: The convenience of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 2-6: The security of unmanned stores will have a positive (+) impact on the economic value

Hypothesis 3-1: The responsiveness of unmanned stores will have a positive (+) impact on the psychological value

Hypothesis 3-2: The tangibility of unmanned stores will have a positive (+) impact on the psychological value

Hypothesis 3-3: The accessibility of unmanned stores will have a positive (+) impact on the psychological value

Hypothesis 3-4: The reliability of unmanned stores will have a positive (+) impact on the psychological value

Hypothesis 3-5: The convenience of unmanned stores will have a positive (+) impact on the psychological value

Hypothesis 3-6: The security of unmanned stores will have a positive (+) impact on the psychological value

2) The Relationship Between Consumer Value and Purchase Intention

The key elements of consumer value, categorized into experiential, economic, and psychological values, play a significant role in determining an individual's decision-making process when purchasing goods or services. Firstly, the experiential value is directly connected to an individual's satisfaction with the product or service itself. Experiential value is particularly heightened when consumer needs are met, as the enjoyment derived from the expected performance or quality fulfills consumer needs (Kim, 2020). In essence, positive consumer experiences can influence the intention to revisit and remain loyal to unmanned stores.

Secondly, the economic value for consumers is associated with the perceived quality and value of a product or service in relation to its price. When consumers perceive the price as appropriate and the utility as sufficient compared to the cost, the level of economic value increases (Park et al., 2011). Consumers who experience reasonable value for money are likely to perceive higher economic value, which in turn influences their intention to frequent unmanned stores more often.

Furthermore, psychological value is related to the consumer's psychological response, such as brand trust or image (Lee, 2014). Psychological value is assessed when the consumer's perception of a product's brand is

positive or when the brand's values align with the consumer's values. Satisfied consumers of products or services from unmanned stores are likely to experience an increase in psychological value, which is associated with a higher intention to revisit the store.

Thus, within consumer value, these three elements are highly interrelated, and the intention to engage with a service or product is based on the consumer's experiential, economic, and psychological values. These evaluated elements can aid unmanned store businesses in devising effective purchasing strategies and serve as crucial evidence in influencing long-term purchasing intentions. Additionally, consumer value assists in decision-making during purchases and plays an efficient role in renewing the growth and marketing strategies of unmanned stores.

Based on these considerations, the following hypotheses are proposed:

Hypothesis 4-1: Experiential value will have a positive (+) impact on stickiness intention.

Hypothesis 4-2: Economic value will have a positive (+) impact on stickiness intention.

Hypothesis 4-3: Psychological value will have a positive (+) impact on stickiness intention.

## ANALYSIS RESULTS

### Characteristics of the Sample

The demographic characteristics of the sample used in this study's analysis are as follows. In terms of gender, there were 105 males (32.9%) and 214 females (67.1%), showing a higher response rate among women. By age, there were 163 respondents in their 20s (51.1%), 92 in their 30s (28.8%), 41 in their 40s (12.9%), and 23 aged 50 and above (7.2%). Geographically, 273 respondents (85.6%) were from Seoul and 46 (14.4%) from Gyeonggi. Professionally, 119 were students (37.3%), 110 in the service industry (34.5%), 63 in office jobs (19.7%), 15 in professional/technical jobs (4.7%), and 12 in other sectors (3.8%). In terms of frequency of unmanned store usage, 180 respondents (56.4%) used convenience stores, 95 (29.8%) used snack and ice cream stores, and 44 (13.8%) used self-service laundromats. Regarding visit frequency, 46 respondents (14.4%) visited 2-5 times, 141 (44.2%) 6-10 times, and 132 (41.4%) more than 11 times. Lastly, for the cost of usage, 24 respondents (7.5%) spent less than 10,000 won, 192 (60.2%) between 10,000 and 30,000 won, 81 (25.4%) between 30,000 and 50,000 won, and 22 (6.9%) more than 50,000 won.

### Reliability and Validity of Measurement Items

The validity of the measurement model was tested using the collected data (n=319). For the validity test of the measurement model, both convergent and discriminant validity tests, which are commonly used in social science research, were conducted. Reliability was verified using the widely used Cronbach's α coefficient (above 0.7) (Hong, 2000). Confirmatory factor analysis results using AMOS were applied for the verification of convergent validity, where factor loadings are generally considered significant if they are ±0.4 or above (Kang, 2013).

Discriminant validity, which verifies the extent to which two similar concepts are distinctly differentiated, was assessed using the average variance extracted (AVE) method and Pearson correlation analysis proposed by Fornell and Larcker (1981). If the square root of the AVE value of each construct exceeds the correlation coefficients between that and other constructs, it indicates the presence of discriminant validity (Kang, 2013; Hong, 2000).

Table 2 shows the results of the reliability and validity tests for the variables used in this study. The reliability test revealed no items that compromised reliability, with Cronbach's α values ranging from 0.81 to 0.912, which are above the recommended threshold (0.7), suggesting the measurement items were reliable (Hong, 2000). Also, factor loadings for the validity test appeared to meet the established criteria, indicating no issues with the validity of the measurement items. Lastly, discriminant validity, assessed using average variance extraction values, was deemed secured (Kang, 2013). These results statistically validate the internal consistency and validity of the survey items. Table 2 presents the reliability and validity verification results for the measurement model. Moreover, as shown in Table 3, the square root values of variance extraction marked on the diagonal were

higher than the correlation coefficients of each factor, confirming the discriminant validity among the constructs.

**Table 2. Reliability and validity of measurement items**

| Variables | Measurement Items | Factor Loadings | Measurement Errors | Cronbach's α | C.R | AVE |
|---|---|---|---|---|---|---|
| Responsiveness | RES1 | 0.774 | 0.432 | 0.896 | 0.884 | 0.657 |
| | RES2 | 0.814 | 0.377 | | | |
| | RES3 | 0.880 | 0.253 | | | |
| | RES4 | 0.840 | 0.372 | | | |
| Tangibility | TAN1 | 0.784 | 0.586 | 0.889 | 0.826 | 0.544 |
| | TAN2 | 0.807 | 0.554 | | | |
| | TAN3 | 0.846 | 0.528 | | | |
| | TAN4 | 0.833 | 0.579 | | | |
| Accessibility | ACC1 | 0.775 | 0.564 | 0.886 | 0.856 | 0.598 |
| | ACC2 | 0.780 | 0.494 | | | |
| | ACC3 | 0.837 | 0.375 | | | |
| | ACC4 | 0.865 | 0.351 | | | |
| Reliability | REL1 | 0.826 | 0.323 | 0.886 | 0.871 | 0.628 |
| | REL2 | 0.836 | 0.346 | | | |
| | REL3 | 0.801 | 0.448 | | | |
| | REL4 | 0.789 | 0.451 | | | |
| Convenience | CON1 | 0.805 | 0.588 | 0.912 | 0.870 | 0.626 |
| | CON2 | 0.862 | 0.384 | | | |
| | CON3 | 0.901 | 0.286 | | | |
| | CON4 | 0.838 | 0.475 | | | |
| Security | SEC1 | 0.760 | 0.698 | 0.908 | 0.844 | 0.576 |
| | SEC2 | 0.818 | 0.584 | | | |
| | SEC3 | 0.904 | 0.369 | | | |
| | SEC4 | 0.885 | 0.441 | | | |
| Experiential value | EXP1 | 0.751 | 0.765 | 0.844 | 0.792 | 0.560 |
| | EXP2 | 0.848 | 0.429 | | | |
| | EXP3 | 0.831 | 0.357 | | | |
| Economic value | ECO1 | 0.664 | 0.906 | 0.810 | 0.773 | 0.535 |
| | ECO2 | 0.845 | 0.333 | | | |
| | ECO3 | 0.816 | 0.345 | | | |
| psychological value | PSY1 | 0.796 | 0.428 | 0.869 | 0.852 | 0.658 |
| | PSY2 | 0.870 | 0.301 | | | |
| | PSY3 | 0.824 | 0.348 | | | |
| Stickiness Intention | STI1 | 0.863 | 0.368 | 0.899 | 0.859 | 0.604 |
| | STI2 | 0.871 | 0.324 | | | |
| | STI3 | 0.844 | 0.380 | | | |
| | STI4 | 0.778 | 0.780 | | | |

**Table 3. Correlations among Constructs**

| Factor | Correlations | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Responsivenes | **0.881** | | | | | | | | | |
| Tangibility | 0.552** | **0.738** | | | | | | | | |
| Accessibility | 0.585** | 0.612** | **0.773** | | | | | | | |
| Reliability | 0.564** | 0.518** | 0.574** | **0.792** | | | | | | |
| Convenience | -0.005 | -0.048 | -0.036 | 0.015 | **0.791** | | | | | |
| Security | -0.014 | -0.026 | -0.025 | 0.066 | 0.591** | **0.759** | | | | |
| Experiential V | 0.526** | 0.495** | 0.518** | 0.574** | -0.075 | -0.064 | **0.748** | | | |
| Economic V | 0.523** | 0.159** | 0.475** | 0.673** | -0.038 | -0.012 | 0.634** | **0.731** | | |
| Psychological V | 0.368** | 0.236** | 0.357** | 0.551** | 0.001 | -0.028 | 0.443** | 0.591** | **0.811** | |
| Stickiness I | 0.480** | 0.627** | 0.499** | 0.582** | -0.039 | -0.022 | 0.549** | 0.599** | 0.586** | **0.777** |
| Average | 4.854 | 4.654 | 4.853 | 5.259 | 4.578 | 4.480 | 5.130 | 5.157 | 5.572 | 5.225 |
| Std.Dev. | 0.935 | 1.136 | 0.997 | 0.928 | 1.116 | 1.211 | 1.063 | 0.962 | 0.961 | 1.082 |

** p<0.01 number at the diagonal line is average variance extracted (AVE).

## Validation of Measurement Model Fit

After verifying the reliability and validity of the measurement model, the fit of the collected data to the research model was validated using AMOS. The initial fit of the measurement model was tested using a total of 37 measurement items. The fit was assessed using commonly used indices in previous studies, including a Goodness-of-fit Index (GFI) of above 0.9, a Normed Fit Index (NFI) of above 0.9, a Root Mean Square Error of Approximation (RMSEA) of below 0.05, and a Comparative Fit Index (CFI) of above 0.9 with a p-value (>=0.05). The results of the model fit validation showed χ^2 = 1147.116 (df=584), p=0.000, CMIN/DF=1.964, GFI=0.836, NFI=0.877, CFI=0.935, RMSEA=0.055, AGFI=0.803, TLI=0.926, IFI(Delta2)=0.936. All indices were above the recommended values, indicating that there were no issues with the fit of the model. This suggests that the data collected for validating the research model are suitable for the study's framework (Hong, 2000).

## Results of Hypothesis Testing

After validating the measurement model with a total of 319 data points, a Structural Equation Modeling (SEM) was conducted using AMOS to examine the relationships between variables proposed in the research model. The SEM analysis yielded two key results. The first result pertains to the fit of the structural model. The fit indices for the research model were $\chi^2$ = 1287.468 (DF=593), p=0.000, CMIN/DF=2.171, RMSEA=0.061, NFI=0.862, CFI=0.92, GFI=0.821, AGFI=0.788, TLI=0.91, IFI(Delta2)=0.92. Based on CFI, TLI, and RMSEA, the indices suggested by Hong Se-hee (2000) for model fit, the fit of the research model was generally found to be satisfactory. The results of the hypothesis tests are as follows:

First, in terms of unmanned store characteristics, responsiveness had a positive impact (β=0.165) on experiential value among consumer values, leading to the acceptance of Hypothesis 1-1. Similarly, tangibility also had a positive impact (β=0.141) on experiential value, resulting in the acceptance of Hypothesis 1-2. However, accessibility did not have a significant impact (β=0.062) on experiential value, leading to the rejection of Hypothesis 1-3. Reliability positively influenced (β=0.518) experiential value, accepting Hypothesis 1-4. But, convenience and security did not significantly influence (β=-0.033, β=-0.067) experiential value, leading to the rejection of Hypotheses 1-5 and 1-6.

Second, in the case of unmanned store characteristics, responsiveness did not significantly influence (β=0.052) economic value, leading to the rejection of Hypothesis 2-1. Tangibility, accessibility, and reliability impacted

economic value (β=0.166, β=-0.153, β=0.815), accepting Hypotheses 2-2, 2-3, and 2-4. However, convenience and security did not significantly affect (β=-0.001, β=-0.055) economic value, resulting in the rejection of Hypotheses 2-5 and 2-6.

Third, regarding unmanned store characteristics, responsiveness did not significantly affect (β=0.056) psychological value, rejecting Hypothesis 3-1. However, tangibility negatively influenced (β=-0.154) psychological value, accepting Hypothesis 3-2. Accessibility did not significantly affect (β=-0.029) psychological value, leading to the rejection of Hypothesis 3-3. Reliability had a positive impact (β=0.807) on psychological value, accepting Hypothesis 3-4. Convenience did not significantly affect (β=0.054) psychological value, rejecting Hypothesis 3-5. Lastly, security negatively influenced (β=-0.12) psychological value, leading to the acceptance of Hypothesis 3-6.

Fourth, among consumer values, experiential value positively influenced (β=0.296) stickiness intention, accepting Hypothesis 4-1. Economic value also had a positive impact (β=0.42) on stickiness intention, leading to the acceptance of Hypothesis 4-2. Furthermore, psychological value positively influenced (β=0.369) stickiness intention, resulting in the acceptance of Hypothesis 4-3.

## CONCLUSION

While unmanned stores have evolved in various forms to suit domestic circumstances in Korea, there has been a relative lack of research on the impact of these stores on consumer value and purchase intentions. Particularly, as the types and formats of unmanned stores in Korea are increasing rapidly without limitations, the absence of tailored domestic research has been a limitation in devising marketing strategies. This study aimed to investigate the impact of the characteristics of unmanned stores on consumer values such as experiential, economic, and psychological values, and how these in turn affect purchase intentions, in the context of the innovative growth of technology. For this purpose, the study was conducted among individuals who have purchased goods from unmanned stores, yielding the following results:

Firstly, it was found that the characteristics of unmanned stores, such as responsiveness, tangibility, and reliability, positively influence the experiential value of consumers, thereby increasing their purchase intentions. tangibility also positively impacts economic value, and reliability influences psychological value. However, tangibility and security were found to have a negative impact on the role of psychological value in influencing consumer stickiness intentions. This indicates that responsiveness, tangibility, and reliability are key elements of unmanned stores and that consumer value can be enhanced when unmanned stores offer quick responses, a variety of goods and services, and ensure the reliability and safety of products and services.

Secondly, it was confirmed that experiential, economic, and psychological values each have a distinct positive impact on stickiness intentions. This finding is consistent with previous research, underscoring the essential role of consumer value in increasing purchase intentions. The results suggest that securing consumer value is a prerequisite for enhancing purchase intentions.

However, this study has several limitations that must be considered in interpreting the results. Firstly, the variables of the study, including unmanned store characteristics, consumer value, and purchase intentions, were relatively limited, which may have led to a lack of reflection of various characteristics and values. Secondly, by limiting the research subjects to 350 individuals, the study may not have captured the diversity of consumer types. Future research should expand the number of subjects and include variables such as occupational groups, income levels, and a wider range of ages. Thirdly, the study did not distinguish between different types of unmanned stores, so the experiences of the research subjects with various unmanned stores were not differentiated in the results. Future research should consider these limitations, using surveys that reflect a broader range of variables and conducting studies on diverse consumer groups to explore the impact of various consumer values on purchase intentions. Additionally, employing big data and advanced analytical techniques would be advisable to enhance the credibility and accuracy of future research.

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