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Examining the Impact of Consumer Innovativeness on Brand Equity Components and Purchasing Behavior: A SEM-Based Field Study in the Agricultural Equipment Industry

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ABSTRACT

Consumer innovativeness is a crucial concept that reflects individuals' tendencies to adopt new products, services, or ideas. Evolving technology and changing living standards continuously transform consumer needs. In the agricultural sector, these innovative tendencies foster the development of technology-based products. Farmers increasingly demand innovative agricultural equipment that enhances efficiency and simplifies work processes. This study examines the relationship between consumer innovativeness and brand equity components. Based on this relationship, the study aims to reveal farmers' innovation adoption and purchasing behaviors. The findings indicate that innovative products not only improve operational efficiency but also enhance consumer brand awareness, strengthen perceived quality, and reinforce brand loyalty. Additionally, the study identifies differences in innovation adoption based on consumers' age and education levels. The results suggest that strategies related to consumer innovativeness can serve as a valuable resource for guiding businesses' marketing activities. Furthermore, they highlight the critical role of consumer innovativeness in achieving competitive advantage and ensuring long-term sustainable production in the agricultural sector

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Tüketici Yenilikçiliğinin Marka Denkliği Unsurlarına ve Satın Alma Davranışı Üzerine Etkisinin İncelenmesi: Tarım Ekipmanları Sektöründe YEM Tabanlı Bir Uygulama

ÖZET

Tüketici yenilikçiliği, bireylerin yeni ürün, hizmet veya fikirleri benimseme eğilimlerini ifade eden önemli bir kavramdır. Gelişen teknoloji ve değişen yaşam standartları, tüketicilerin ihtiyaçlarını sürekli olarak dönüştürmektedir. Tarım sektöründe de bu yenilikçi eğilimler, teknoloji temelli ürünlerin geliştirilmesine yol açmaktadır. Çiftçiler, verimliliği artıran ve iş süreçlerini kolaylaştıran yenilikçi tarım ekipmanlarını daha fazla talep etmektedirler. Yürütülen bu çalışma, tüketici yenilikçiliği ile marka denkliği unsurları arasındaki ilişkiyi incelemektedir. Bu ilişkiden hareketle, çiftçilerin yenilikleri benimseme ve satın alma davranışlarının ortaya konulması amaçlanmaktadır. Firmaların pazarlama stratejileri geliştirmelerine katkı sunmayı hedefleyen bu çalışma sonuçlarına göre yenilikçi ürünlerin yalnızca iş verimliliğini artırmakla kalmayıp, aynı zamanda tüketicinin marka farkındalığını arttırdığı, kalite algısını ve markaya olan bağlılığı güçlendirdiği belirlenmiştir. Tüketicilerin yaş ve eğitim düzeylerine göre yenilikleri benimsemeleri arasında farklılıkların olduğu da ayrıca tespit edilmiştir. Sonuçlar, tüketici yenilikçiliği ile ilgili stratejilerin işletmelerin pazarlama faaliyetlerine yön verecek önemli bir kaynak teşkil edeceğini göstermektedir Ayrıca tarım sektöründe firmaların rekabet avantajı elde etmeleri ve uzun vadeli sürdürülebilir üretim sağlamaları açısından kritik olduğunu ortaya koymaktadır.

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INTRODUCTION

Although consumers' needs are finite, their desire to satisfy them appears virtually limitless. Advancements in technology, social interactions, and living standards continuously shape these desires. In response to the ever-evolving consumer landscape, companies consistently strive to develop and introduce products that best address consumer expectations. Consumers' desire to satisfy their needs extends beyond improvements to existing products—it reflects an openness to innovation, driven by curiosity, exploration, and a willingness to take risks. This tendency, known as consumer innovativeness, not only drives demand for new, technologically advanced products but also plays a crucial role in shaping brand loyalty. The influence of innovation is particularly significant in technology-driven sectors such as agriculture, where evolving consumer expectations and the adoption of new technologies are transforming both consumption patterns and production processes.

The agricultural sector is deeply affected by rapid technological developments, including the Internet of Things (IoT), artificial intelligence, automation, sensor technologies, GPS, and precision farming tools. For example, the adoption of autonomous GPS-guided tractors has allowed farmers to optimize fuel consumption and enhance field efficiency. Studies show that these tractors reduce fuel use by 15% and increase efficiency by up to 20% (D'Antonio, 2023). Similarly, drone technology for crop monitoring and pesticide application has led to a 30% reduction in pesticide use, while also improving coverage efficiency by 25-40% (Zanin et al, 2022; Subramanian et al, 2021; Liu et al, 2023). These innovations demonstrate how consumer innovativeness can drive the adoption of technology that improves both productivity and sustainability in agriculture. Farmers, as key stakeholders in this sector, continuously evolve their expectations regarding the equipment they use to maintain productivity and efficiency. However, the adoption of such technologies is not merely a matter of availability but also of individual differences in innovativeness (Altuntaş, 2024). In this context, agricultural equipment manufacturers not only focus on developing advanced, efficient tools but also aim to appeal to farmers who are more open to trying and adopting new technologies. As a result, consumer innovativeness in agriculture influences how quickly and effectively such technologies diffuse across farming communities.

Consumers in the market today have access to a broad range of products, including those from well-established brands and new market entrants. Given such a vast array of alternatives, consumers find it easier to switch between brands. Digital platforms, pricing strategies, and perceived quality all play significant roles in shaping consumer preferences and influencing brand-switching behavior. Consumers now access product information, user experiences, and compare alternative products in real-time. In response, manufacturing firms focus on strengthening their market presence by building brand loyalty and trust-two outcomes closely associated with the consumer's openness to innovation. Recognizing the need to align their marketing strategies with target market expectations, firms increasingly emphasize differentiation strategies to stand out in a highly competitive environment. Among the most critical actions companies can take to maintain a competitive edge and capture consumer interest is fostering innovation.

Management thinker Peter Drucker identifies two core functions of business: marketing and innovation (Cohen, 2011). In line with this perspective, firms aiming to expand their market share must not only innovate but also strategically communicate their innovations to appeal to consumers' innovative tendencies. While many previous studies have explored the relationship between innovativeness and demographic traits, there is a growing need to investigate how consumer innovativeness shapes brand perceptions and purchasing behavior, particularly in under-researched markets such as agricultural machinery.

When consumer innovativeness is paired with brand loyalty, it becomes a powerful determinant of purchasing behavior. For instance, an innovative agricultural machine not only enhances efficiency but also reinforces trust in the brand. This trust, in turn, influences consumers' purchasing decisions and ultimately strengthens their brand loyalty. Studies conducted by Truong (2013) and Wang and Cho (2012) demonstrate how innovative products reinforce brand loyalty and how this, in turn, affects consumer purchasing behavior. In the agricultural equipment market, farmers' trust and loyalty toward certain brands are often shaped by both perceived innovation and peer influence within their communities.

In the national and international literature, several studies have examined agricultural mechanization and equipment adoption across regions (Işık et al., 2003; Bilim et al., 2014; Aybek et al., 2021; Altuntaş et al., 2025). Others have explored behavioral aspects of producers, such as Adnan et al. (2019) on the use of green fertilizers, Damalas and Koutroubas (2018) on pesticide use, and Valizadeh et al. (2020) on drip irrigation adoption. Zarei et al. (2022) investigated Iranian farmers' behavioral intentions toward agricultural e-commerce using the technology

acceptance model (TAM). However, the domestic literature still lacks focused research on the role of *consumer innovativeness* in the agricultural sector. This study aims to contribute to closing that gap.

Moreover, achieving optimal levels of mechanization requires aligning tractors, tools, and equipment with the scale and production patterns of farms (Abdikoglu, 2019). To do so effectively, it is essential to understand producers' behavior—how they adopt and utilize new technologies, and the factors shaping these decisions. This research aims to contribute to that understanding by focusing on the role of innovativeness among farmers.

The main aim of this study is to explore the impact of innovative products on the components of brand equity—brand loyalty, perceived quality, and brand awareness—and to examine how these factors influence consumer purchasing behavior. By focusing on Türkiye's rapidly growing agricultural equipment market, this study aims to measure consumer innovativeness and identify its relationship with brand loyalty, perceived quality, and brand awareness. Additionally, the research aims to explore whether consumers' adoption of innovations varies with demographic characteristics such as age and education level. Observations of farmer behavior indicate that those who are satisfied with their agricultural equipment often recommend and influence other farmers' purchasing decisions. This highlights how brand preferences are shaped among farmers and why differentiation is essential in a highly competitive market. As a result, the agricultural equipment sub-sector emerges as a research-worthy field.

According to the Turkish Statistical Institute (TÜİK, 2024), the agricultural equipment market comprises 99 different product categories. Given the intense competition in this market, analyzing consumer expectations regarding brand preferences and the factors influencing their purchasing behavior is expected to offer valuable insights into how innovation-oriented perspectives influence decision-making. For companies, innovative products not only drive sales but also strengthen brand loyalty, playing a crucial role in ensuring long-term success. Therefore, it is essential to align marketing strategies and brand management with an innovation-oriented approach.

Conceptual Framework

Consumer innovativeness

Consumer innovativeness is a crucial dimension of consumer behavior that reflects individuals' tendencies to try and adopt new products, services, or ideas. This concept encompasses both individual differences and societal trends, playing a significant role in businesses' new product development processes and marketing strategies.

The concept of consumer innovativeness, which relates to consumers' adoption of innovations, was classified based on the adoption criteria of innovations through the research conducted by Everett Rogers in 1962. Rogers, who observed the development of new ideas and changing life standards with technological advancements, developed the Diffusion of Innovations theory (Cheng, 2004). Since its emergence, this theory has been widely used in studies on the adoption of technological innovations. Rogers (1976) defines innovation as an idea, practice, or object that an individual perceives as new. This definition renders the concept of innovation relative, meaning that what is considered an innovation for some may not be perceived as innovative by others (Karaarslan & Akdoğan, 2013).

Consumer innovativeness includes psychological, sociological, and demographic factors that shape individuals' attitudes and behaviors toward new products or services. It is essentially the tendency of consumers to adopt innovations (Tellis et al., 2009). There are two main approaches regarding consumer innovativeness. The first approach conceptualizes consumer innovativeness as personal innovativeness, treating it as a personality trait (Midgley & Dowling, 1978). The second approach suggests that a consumer's level of interest in a specific product determines whether they are an innovative consumer; high interest makes the person an innovative consumer, whereas low interest does not (Goldsmith & Hofacker, 1991).

Identifying innovative consumers is important for various reasons. Understanding consumers' tendencies to adopt innovations provides valuable insights for businesses in their marketing decisions (Karaarslan & Akdoğan, 2015). Since the behavior of innovative consumers directly influences businesses' product development, positioning, and communication strategies, developing strategies aligned with consumer innovativeness can provide a competitive advantage.

Brand equity elements

Brand equity is a multidimensional concept that defines a brand's market value and competitive advantage. In the literature, it is typically described as a structure linked to brand loyalty, perceived quality, brand awareness, brand associations, and other brand-related assets. This concept plays a crucial role in shaping consumers' brand perceptions and influencing companies' economic positions in the market.

Aaker (1996), a key contributor to brand equity research, defines it as the assets and liabilities linked to a brand, brand name, or symbols, which either enhance or detract from the value a business delivers through its products and services. This concept is shaped by how consumers perceive and evaluate a product. Brand equity typically represents intangible assets and significantly impacts consumer behavior. Keller (1998) considers brand equity as the leading factor in the brand-building process. The key elements of brand equity play a fundamental role in the formation of brand value. These elements include:

1. Brand awareness: This refers to the level of consumer recognition of a brand. A brand's recognizability is achieved only when consumers notice it or when firms create awareness (Onurlubaş, 2018). Brand awareness determines the position a brand holds in consumers' minds compared to competitors. It plays a crucial role in the purchasing process (Aktepe & Baş, 2008) as it significantly influences the first impressions and decision-making processes of consumers. It consists of two dimensions: brand recall and brand recognition (Erdil & Uzun, 2009). Brand recognition occurs at the point of sale, while brand recall occurs before the purchasing process (Kaptanoğlu et al., 2019). Another sub-dimension of brand awareness is brand familiarity, which includes the physical attributes of a brand, such as color, size, shape, and packaging. Therefore, product design, packaging, logos, and symbols play a key role in increasing brand familiarity (Kızgın & Benli, 2018:). Without brand awareness, consumers cannot develop perceptions of brand quality or brand associations, making brand loyalty impossible (Albar & Oksuz, 2013). Brand awareness plays a significant role in consumer product selection and purchasing decisions.

2. Perceived quality: This refers to consumers' general perceptions of how well a product meets their expectations. It is a critical factor in purchasing decisions and is directly related to brand loyalty. Perceived quality includes both intangible emotional impressions and tangible functional attributes of a product. As a result, factors such as a brand's reliability, performance, and durability come to the forefront. Thus, perceived quality is not merely about an emotional connection with a brand but also emphasizes the product's functional and practical aspects. Products perceived as high quality by consumers tend to have higher brand value (Ayas, 2012). Consumers are more likely to consider high-quality products successful.

3. Brand loyalty: This refers to the emotional and rational connections consumers establish with a brand. It is observed when consumers are willing to pay a higher price for a specific brand within the same product category and recommend it to others (Giddens, 2002). It represents either a purchase intention or actual purchase behavior, or both simultaneously (Matzler et al., 2008). Brand loyalty, which influences repeat purchases and word-of-mouth recommendations, is an essential marketing tool in today's highly competitive markets for fostering long-term consumer relationships (Torlak et al., 2014). As brand loyalty increases, the brand becomes less vulnerable to competitors and gains a stronger market position, ultimately leading to greater profitability (Aaker, 2010). Brand loyalty is known to enhance profitability in both the short and long term (Rowley, 2005).

4. Brand associations: These are the emotional and cognitive connections consumers make with a brand. These associations significantly influence the brand's identity and positioning. Brand association is a struggle to create a mental link between the brand and consumers. In recent years, companies in the agricultural sector have intensified their efforts to develop such associations due to increasing competition. Since firms aim to differentiate themselves, marketers use brand associations for differentiation, positioning, brand extension, and creating positive consumer attitudes and emotions (Low & Lamb, 2000). Brand associations form the foundation of brand loyalty.

5. Purchasing behavior: Purchasing behavior is a complex psychological and social phenomenon encompassing consumers' processes of selecting, buying, and using a product or service. Consumer decision-making and purchasing behavior have been extensively researched for years and remain a relevant topic. The purchasing process begins when a consumer recognizes a need and continues until that need is satisfied, passing through several stages. As Taşkın (2003) states, "Every consumption leads to production." Purchasing behavior is shaped by the interaction of individual and environmental factors in consumers' decision-making processes. Research on consumer behavior aims to understand these fundamental elements and guide businesses in adjusting their marketing strategies accordingly. The core of purchasing behavior lies in the emergence of needs and the evaluation of available options to satisfy those needs. Before making a purchase, consumers typically compare alternatives and assess factors such as price, quality, and brand reputation. This evaluation process is based on various conscious or subconscious analyses. Several factors influence consumers' purchasing decisions, including psychological aspects, personal preferences, social environment, cultural influences, and economic conditions. For example, while one consumer may prioritize affordability, another may prefer a prestigious, high-quality brand. This highlights how individual differences shape purchasing behavior. Additionally, environmental factors play a crucial role. Consumers often take into account the recommendations of family, friends, or their social circle.

MATERIAL and METHOD

Scope and Objective of Research

Innovation remains a relevant and significant concept. The main goal of this study is to investigate the impact of consumer innovativeness on specific elements of brand equity and to explore how these elements affect consumer purchasing behavior. Additionally, the study aims to identify whether there are differences in consumers' acceptance of innovations based on age and education variables.

The agricultural sector was selected as the focus of this study to achieve these objectives. Due to its strategic importance, agriculture is considered a valuable field for research. In this sector, producers simultaneously act as consumers. Understanding farmers' behaviors has become increasingly significant for companies in recent years. Compared to the past, farmers have become more conscious, knowledgeable about their needs, and willing to research and experiment with innovations in their production processes. Furthermore, technological advancements have had a substantial impact on the sector.

The agricultural sector consists of multiple sub-sectors, and this study specifically focuses on agricultural equipment. This sub-sector is characterized by intense competition. Therefore, while firms aim to enhance the loyalty of existing customers, they also develop strategies to raise awareness among potential new customers. The findings of this study are expected to contribute to firms' strategy development and provide guidance for new market entrants. Moreover, the results are anticipated to assist agricultural machinery manufacturers in understanding the innovation perceptions of local farmers and their brand loyalty. These insights could help companies formulate target market strategies, optimize resource allocation, and guide customer-oriented marketing activities.

Limitations, Hypotheses, and Model of Research

As the research is limited to the Kırşehir province, the findings cannot be generalized to all farmers in Türkiye. The perception of innovation among farmers has been examined through their preferences and purchasing decisions concerning specific agricultural machinery (plows, disc harrows, cultivators, and seed drills). The primary reason for this choice is that these machines are both widely used and offer significant brand- and model-based variety. Moreover, as they are utilized in the early stages of the production cycle, they have a more direct impact on farmers' perceptions of product performance and quality. Due to the noticeable price differences in the market, they also possess strong potential to influence consumer preferences. With these characteristics, the four selected types of equipment offer a high level of representativeness in measuring innovation adoption and brand equity components. Therefore, evaluating these specific equipment categories was expected to yield more accurate and comparable insights into farmers' brand perceptions and openness to innovation. Sector-specific dynamics such as sales frequency, variety of innovative product options, and regional usage prevalence were also taken into account when selecting machinery types. Tractors, irrigation equipment, harvesting machines, and other agricultural tools were excluded from the study.

The study was conducted based on consumers' experiences with a specific brand, which constitutes a limitation in terms of the adaptation of scale statements. The research model employed in this study is based on Aaker's (1991) brand equity components. However, only measurable and behaviorally relevant variables—such as brand awareness, perceived quality, and brand loyalty—were included in the model. More abstract and interpretive elements, such as brand image and associations, were excluded due to the need for a broader theoretical framework and more extensive data collection in the agricultural context. This decision was made to maintain a clear and focused investigation into how consumer innovativeness influences specific brand equity dimensions. Brand image and brand associations, while undoubtedly important, are broader constructs that warrant separate investigation due to their complex and multidimensional nature. Including these elements would require a broader conceptual framework and additional variables that fall outside the current research objectives.

By narrowing the focus to brand loyalty, perceived quality, and brand awareness, this study aims to offer a deeper understanding of how consumer innovativeness interacts with these components, particularly in the context of the agricultural equipment market. Although the role of brand image and associations is acknowledged, their impact on purchasing behavior and brand equity will be explored in future studies, ensuring that each factor is given the attention it deserves. This focused approach allows for more detailed analysis within the limits of the research scope and ensures that the study's objectives are aligned with the underlying research questions.

Another limitation of the study pertains to the exclusion of certain socioeconomic variables such as farm size and producer income. Although these factors are known to influence technology adoption in agriculture by affecting a farmer's investment capacity and access to innovation, they were not included in the current research model. This decision was made to maintain a focused and manageable study scope.

Various hypotheses were developed to address the research questions:

- H1: There is a difference between individuals' age and their acceptance of innovations.
- H2: There is a difference between individuals' education level and their acceptance of innovations.
- H3: Consumer innovativeness has a positive impact on brand awareness.
- H4: Consumer innovativeness has a positive impact on brand loyalty.
- H5: Consumer innovativeness has a positive impact on perceived quality.
- H6: Brand awareness has a positive impact on purchasing behavior.
- H7: Perceived quality has a positive impact on purchasing behavior.
- H8: Brand loyalty has a positive impact on purchasing behavior.

Based on these hypotheses, the research model was developed, as illustrated in Figure 1.

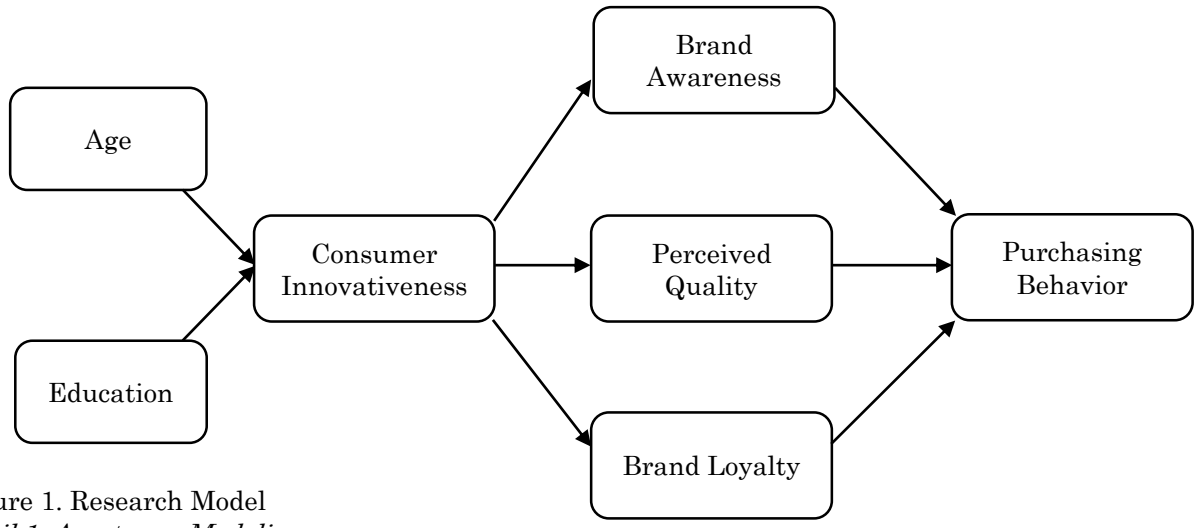

Figure 1. Research Model
Şekil 1. Araştırma Modeli

Data Collection and Survey Design:

The required data were collected through face-to-face surveys. Before the field study, ethics committee permission was obtained from the Kırşehir Ahi Evran University Social and Human Sciences Scientific Research and Publication Ethics Committee with the decision number 2025/01/36 dated 08.01.2025. The survey is divided into three sections. The first section collects information on participants' education, age, and the type and brand of agricultural equipment they own. The second section uses a five-point Likert scale with 14 statements to measure brand loyalty, perceived quality, brand awareness, and purchasing behavior, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). The third section also utilizes a five-point Likert scale to evaluate consumer innovativeness through eight statements.

The statements used in the survey were adapted from previous scientific studies in the literature, ensuring their relevance to the research topic. The first scale employed is the brand loyalty scale, which consists of six statements adapted from Bloemer and Odekerken (2003). The brand awareness scale is measured using three statements from Higgins (2006), while the perceived quality scale includes three statements derived from the studies of Kim et al. (2003) and Mittal & Lassar (1998). The purchasing behavior scale comprises four statements adapted from Berens et al. (2005). Consumer innovativeness is measured using six statements adapted from the scale developed by Eryiğit and Kavak (2011) to suit the objectives of this study. The scales used in the study were taken from the literature and adapted to Turkish. The two-way translation method suggested by Brislin (1970) was applied in the adaptation process. First, the English scales were translated into Turkish, then an expert academic with a high command of another language was asked to check these translations and ensure linguistic equivalence by comparing them with the original text. In terms of cultural appropriateness, opinions were obtained from two separate academicians from the agricultural machinery and agricultural economics departments regarding the appropriateness of the scale expressions to the agricultural sector and context. Also, to ensure comprehensibility among the target population—farmers—a preliminary adaptation process was conducted. Once finalized, the questionnaire was carefully monitored during the initial stages of field application. As the items and questions were found to be well understood by the farmers, the survey was continued without modification. To ensure the validity and reliability of the scale adaptations, detailed information on Cronbach's alpha, confirmatory factor analysis, and construct validity is provided under the "Statistical Analysis and Results" section of this study.

Sampling Method:

The study was conducted in the central district of Kırşehir province during September and October of 2024. The survey was administered through face-to-face interviews conducted directly by the researcher in densely populated areas of the city. Prior to the implementation, participants were informed about the purpose and scope of the questionnaire, and their participation was based on voluntary consent. All interviews were conducted with agricultural producers, specifically those engaged in grain production, who are registered in the Farmer Registration System (ÇKS) and own at least one of the specified agricultural machines (plow, seeder, chisel plow, or disc harrow). To enhance the representativeness of the sample, the interview locations were diversified to include various neighborhoods and villages affiliated with the central district. The participants were selected using a simple random sampling method, which ensures that everyone in the population has an equal probability of being chosen, thereby minimizing selection bias. This approach not only reduces costs and time in field research but also enhances the validity of the findings. To determine the number of participants for the survey, a sample size calculation was conducted. The required sample size was determined using the formula for simple random sampling in finite populations. The sample size was determined using the formula proposed by Krejcie and Morgan (1970). The formula used is as follows:

$$n = \frac{N.Z^2.p.(1-p)}{(N-1).e^2 + Z^2.p.(1-p)}$$

n: Required sample size
N: Population size (in this case, appr. 21,500)
Z: Z-value corresponding to the desired confidence level (e.g., Z = 1.96 for a 95% confidence level)
p: Probability value or assumed proportion of success (commonly set at 0.5 or 50%)
e: Margin of error (also referred to as the allowable error or confidence interval; here, 0.05 or 5%)

The simple random sampling method was chosen to ensure that every farmer had an equal probability of being selected for the study. Where n is the required sample size, and N is the population size. According to the Ministry of Agriculture and Forestry, approximately 21,500 registered farmers are registered in the Farmer Registration System (ÇKS) in Kırşehir (Anonymus, 2022). Z is the Z-score corresponding to the desired confidence level (1.96 for 95%), p is the assumed proportion of the population possessing the characteristic of interest (set at 0.5 to maximize variability), and the acceptable margin of error (0.05).

The probability value p=0.5 was selected because it yields the maximum variance $p(1-p)$, which ensures the most conservative and robust sample size estimation. This approach is commonly adopted when there is no prior information about the population proportion. Based on this calculation, the minimum required sample size was determined to be 274 participants. To account for potential issues such as incomplete responses, an additional 10% of surveys were conducted, resulting in 306 valid responses for analysis. The distribution of participants by age and education is detailed in the analysis section of the study.

Statistical Analysis and Findings

For data analysis, the IBM SPSS Statistics (Version 27) software package was used, while SmartPLS 4.0 (Ringle et al., 2024) was employed for model testing. This study follows an explanatory research design, testing the formulated hypotheses. The research takes an inductive approach, starting with specific observations and drawing broader generalizations from them. The study specifically examines farmers in the Kirsehir region to draw general conclusions.

The demographic characteristics of the survey participants are shown in Table 1. Accordingly, the majority of the participants (60%) are between the ages of 30-49, which can be described as young-middle age. 122 participants (40%) are 50 years old and above. The distribution of the participants' educational status is close to each other. More than half (53%) are secondary school graduates, while almost half of the remaining participants (47%) are higher education graduates. It was determined that all participants in the survey have at least one piece of agricultural equipment.

Before moving on to a more detailed analysis of the data collected from the field, it was determined whether the data followed a normal distribution. For this, the skewness and kurtosis values were examined. A normal distribution is assumed when these values range between -1.5 and +1.5 (Tabachnick and Fidell, 2013). As a result of the analysis, the skewness and kurtosis values for the brand awareness scale were skewness: -0.628, kurtosis: 0.122; perceived quality: skewness: -0.485, kurtosis: 0.016; brand loyalty: skewness: -0.691, kurtosis: 0.393; purchase behavior: skewness: -0.245, kurtosis: -0.804; and consumer innovativeness: skewness: -0.479, kurtosis: 0.217. It was determined that the study data followed a normal distribution. Therefore, for the difference tests,

one-way analysis of variance (ANOVA) was chosen for the age variable, as it has three subgroups, and the independent samples t-test was used for the education variable, as it has two subgroups.

Table 1. Demographic Characteristics of Participant's
Çizelge 1. Katılımcıların Demografik Özellikleri

		Frequency	Percent
Age	18-29	71	23.2
	30-49	113	36.9
	50 and above	122	39.9
	Total	306	100.0
Education	Secondary Education	162	52.9
	Higher Education	144	47.1
	Total	306	100.0

To test the hypotheses of the study, first, the difference between the age and education levels of the participants and their consumer innovativeness was tested. To examine this, a one-way analysis of variance (ANOVA) was conducted to determine whether participants' acceptance of innovations differed by age. The results revealed a significant difference between age groups, F (2, 303 N=306) =6.25, p= .002. This indicates that technology acceptance levels vary significantly based on participants' age.

The analysis results have revealed a significant difference between the groups. To identify the groups, a post-hoc test was performed. Since the result of the Levene test was significant (p=.001), the homogeneity of variances between the groups could not be ensured. Since equal variance could not be achieved, a post-hoc test was performed to see the difference between the groups, and the Games-Howell test, which gave the strongest result, was selected. The test results show that there is a significant (p< .001) difference in the acceptance of innovations between participants in the 18-29 age group and those in the 30-49 age group. Similarly, a significant difference was found in the acceptance of innovations between the 30-49 age group and participants aged 50 and over. Participants aged 30-49 tend to research, accept, and adopt innovations more than those in other age groups. The 18-29 age group shows lower interest in accepting innovations, and middle-aged people are more accepting of innovations than other age groups.

To determine the relationship between participants' educational status and their acceptance of innovations, an independent samples t-test was applied. According to the test results, it was determined that the homogeneity of variances between the groups was not ensured, as per the Levene test (p< .001). The two-tailed significance value of the table was p=.028. Therefore, a significant difference in the acceptance of innovations based on educational status was identified. According to the analysis, individuals with higher education (mean: 3.8550) are more innovative or accept innovations more than those with secondary education (mean: 3.7346). The Cohen's d effect size test result showed a medium effect size of .475 and a medium level difference between the two groups. A significant effect of the education variable is seen, t (300, N=306) =6.74, p=.002, people with higher education are more accepting of innovations than those with secondary education.

As a result of the conducted difference tests, hypotheses 1 and 2 were accepted.

Before testing the model constructed in the theoretical framework, the reliability and factor structures of the survey statements were tested with exploratory factor analysis. The Cronbach's alpha coefficient method was used for reliability. A Cronbach's alpha reliability coefficient value of 0.80 or above indicates the reliability of the scales (Altuntas et al., 2015). Robinson et al. (1991) state that in exploratory research, the reliability coefficient can drop to 0.60.

Exploratory factor analysis was conducted to identify the factor structure of the scales measuring brand awareness, perceived quality, brand loyalty, purchase behavior, and consumer innovativeness. First, the Kaiser-Meyer sample adequacy test result was calculated. According to the result, a value of 0.791 was found, indicating that the sample is adequate for factor analysis. The Bartlett's test of sphericity also resulted in p< .001. As a result of the factor analysis, a 3-factor structure was revealed that explained more than half of the total variance (54.853%) of the scales with brand equity elements. The identified factor structure shows that the measurement was conducted in line with the research's objectives.

In the purchase behavior scale, two statements were included, and the reliability of the scale, calculated as a single dimension, was found to be 0.825.

The consumer innovativeness scale consisted of 8 statements; however, during the analysis, two statements that were deemed irrelevant in the correlation matrix were removed. The statement "I don't spend much time checking new agricultural machines" was removed from the scale, and after reanalysis, the statement "When I buy a new

agricultural machine, I decide on my own" was also removed. As a result, a single-factor structure with a high reliability coefficient of 0.827 was found.

The reliability coefficients and factor structures of the scales are presented as a whole in Table 2 below.

Table 2. Reliability Coefficients and Factor Structures of the Scales
Çizelge 2. Ölçeklerin Güvenirlik Katsayıları ve Faktör Yapıları

	Factor Loading	Variance Explained
Brand Loyalty (Cronbach's Alfa:0,853; CR:0,894; AVE: 0,791)		21,468
When I want to change my agricultural equipment, I will still buy "A" brand.	0,898	
Even if other brands make different promises, I will always prefer the "A" brand that I am currently using.	0,812	
"A" brand agricultural equipment is always my first choice.	0,793	
When I want to buy a new model of the "A" brand that I am using, if that product is not available, I wait for it to arrive.	0,787	
I recommend the "A" brand agricultural equipment I use to my circle.	0,745	
I love the "A" brand farming equipment I use	0,712	
Brand Awareness (Cronbach's Alfa:0,829; CR:0,917; AVE: 0,813)		17,132
I recognize "A" brand agricultural equipment when I see it.	0,862	
I have no difficulty remembering the symbol and logo of "A" brand agricultural equipment.	0,847	
I can immediately distinguish "A" brand agricultural equipment from others.	0,810	
Perceived Quality (Cronbach's Alfa:0,866; CR:0,907; AVE:0,764)		16,253
The "A" brand agricultural equipment I use provides me with high quality.	0,914	
The "A" brand agricultural equipment is durable.	0,853	
The after-sales service of the "A" brand agricultural equipment I prefer is unmatched.	0,821	
Purchasing Behavior (Cronbach's Alfa:0,825; CR: 0,916; AVE: 0,729)		13,777
When I buy agricultural equipment, the "A" brand comes first.	0,874	
I can pay a higher price for the "A" brand agricultural equipment I use.	0,776	
Consumer innovativeness (Cronbach's Alpha:0.827; CR; 0,887; AVE:0,733)		16,240
When I am going to buy a new agricultural equipment, I prefer to consult my farmer friends who have experience with that brand.	0,851	
I am constantly in search of new equipment.	0,822	
I prefer to be in places where information is given about new agricultural equipment.	0,784	
I follow websites that introduce new agricultural equipment.	0,731	
I trust the information of my experienced friends before deciding to buy new agricultural equipment.	0,705	
I do research on new models of agricultural equipment.	0,70	

As presented in detail in Table 2 above, all the scales used in the study exhibit high reliability coefficients. Although the purchasing behavior scale includes a limited number of items, which is generally considered a psychometric risk, the results of this study indicate that this limitation does not pose a significant threat to scale validity. The high values of Cronbach's alpha ($\alpha = 0.825$), composite reliability (CR > 0.90), and average variance extracted (AVE > 0.70) demonstrate that the scale maintains sufficient reliability and validity despite the low number of items. According to the results of the confirmatory factor analysis, the factor loadings (λ) of the items exceed 0.700 at a significance level of $p<.001$. The composite reliability (CR>0.70) values of the scales range between 0.887 and 0.917, indicating highly satisfactory levels. Similarly, as seen in Table 2, the average variance extracted (AVE>0.50) scores fall between 0.733 and 0.813, well above the accepted threshold.

After the high reliability levels of the scale expressions were demonstrated, the variance inflation factor (VIF) values were checked for each scale expression. Because the multicollinearity value is expected to be low. Otherwise, the high level of relationship between the independent variables puts the reliability of the model at risk. As a result of the checks, if the VIF value is <5, there is no problem in the linear connection (Craney & Surles, 2002). The VIF values calculated for the variables in the examination varied between 1.478 and 4.324, and it was determined that the value less than 5 for each expression was within acceptable limits.

The Fornell-Larcker criterion was checked to evaluate the discriminant validity of the model before the path analysis. This criterion is an important indicator in terms of showing that the latent variables in the model are separated from each other and measure different structures. To assess discriminant validity, the square root of the average variance extracted for each factor was compared with the correlations between factors, and the results are presented in Table 3. The findings indicate that the square root of the average variance extracted is higher than the corresponding correlation coefficients between factors, confirming that the measurement model possesses discriminant validity.

Table 3. Correlation Coefficient Matrix and Square Roots of Average Variance Extracted Scores
Çizelge 3. Korelasyon Katsayı Matrisi ve Ortalama Varyansın Karekökleri Çıkarılan Puanlar

	BL	BA	PQ	PB	CI
BL	**0,889**				
BA	0,434	**0,901**			
PQ	0,461	0,472	**0,874**		
PB	0,345	0,376	0,381	**0,853**	
CI	0,546	0,568	0,623	0,487	**0,856**

BL: *Brand loyalty*, BA: *Brand awareness*, PQ: *Perceived quality*, PB: *Purchasing Behavior*, CI: *Consumer innovativeness*

After determining the reliability, factor structures, composite and discriminant validity of the scales, path analysis was conducted to examine the relationship between consumer innovativeness and the brand equity elements, namely perceived quality, brand awareness, and brand loyalty, as well as to determine the impact of these elements on purchasing behavior. Path analysis was performed using the partial least squares (PLS) structural equation method via the SmartPls 3.0 program. The analysis was conducted by examining the R^2 value for the explanatory power of the structural model. The model, factor loadings, path coefficients, and the R^2 values of the latent variables are shown in Figure 2 below.

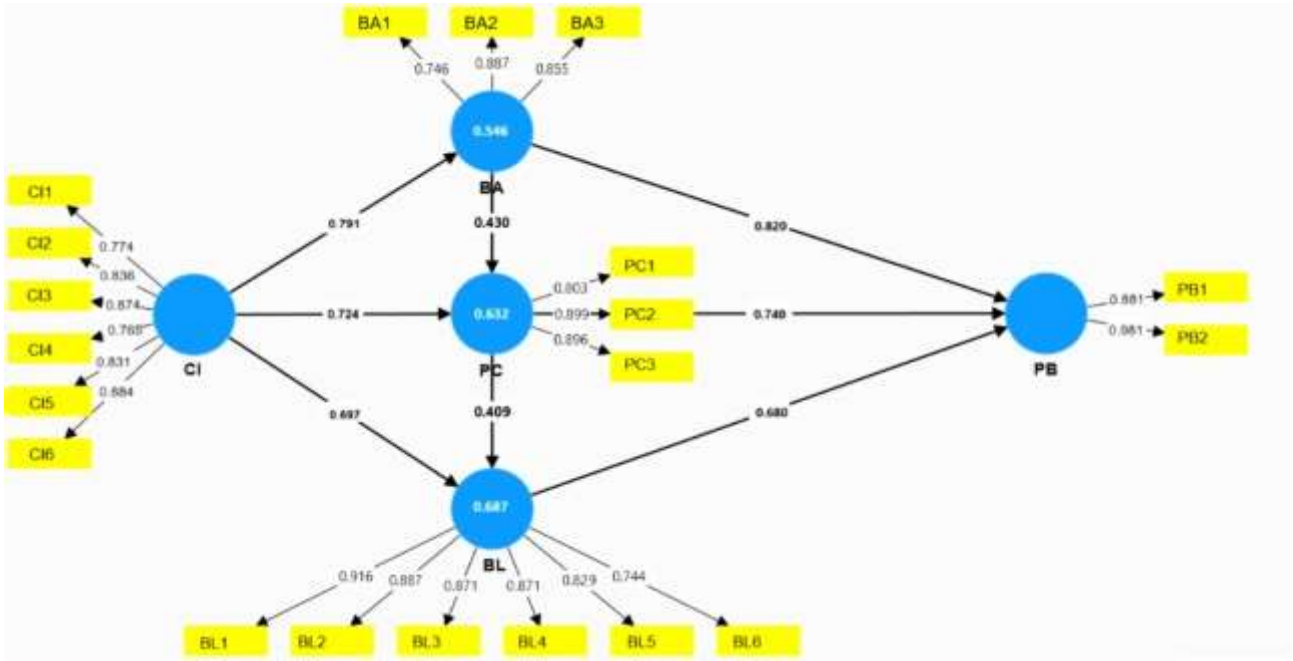

Figure 2. Structural Model Path Analysis
Şekil 2. Yapısal Model Yol Analizi

In addition to evaluating the explanatory power of the model, model fit was assessed using the Standardized Root Mean Square Residual (SRMR) value. The SRMR of the model was found to be 0.052, which is below the threshold value of 0.08, indicating an acceptable model fit (Hu & Bentler, 1999). In Pls-sem, SRMR alone is considered a sufficient fit index (Henseler et al, 2015), but here the normal fit index (NIF) value of the model is also given. The normal fit index (NIF) value for the model's goodness of fit was calculated as 0.923. A value of NIF above 0.90 is considered an acceptable fit (Bentler & Bonett, 1980). PLS is an analytical method that does not require assumptions regarding distribution and sample size, unlike covariance-based structural models (Altuntas, 2017). To assess the data consistency of each scale, the rho_A coefficient was calculated. Accordingly, the values were

determined as follows: perceived quality (0.884), brand loyalty (0.929), brand awareness (0.832), purchasing behavior (0.940), and consumer innovativeness (0.759).

The significance of the model was tested at a 0.05 error probability level (p<.001). The table value of 1.96 was taken as the critical value, and the t-values were calculated using the bootstrapping method. The test type was set as two-tailed, and the subsample size was determined as 1000. The path coefficients of the model, t-values, and significance levels are presented in Table 4 below.

Table 4. Path Coefficients Significance Test Results (Bootstrapping)
Çizelge 4. Yol Katsayıları Önem Testi Sonuçları (Bootstrapping)

	Path Coefficient	t-value	*p*
Consumer innovativeness > Brand loyalty	0.697	3.385	.001
Consumer innovativeness > Perceived quality	0.724	5.594	.001
Consumer innovativeness > Brand awareness	0.791	6.516	.001
Brand awareness > Purchasing behavior	0.820	14.589	.001
Perceived quality > Purchase behavior	0.740	11.694	.001
Brand loyalty > Purchase behavior	0.680	5.875	.001
Brand awareness > Perceived quality	0.430	4.396	.001
Perceived quality > Brand loyalty	0.409	4.105	.001

The model has provided satisfactory results, indicating that consumer innovativeness influences brand loyalty, perceived quality, and brand awareness, and that these elements translate into purchasing behavior. According to the path analysis results, as seen in Table 4, consumer innovativeness has a strong impact on brand loyalty (0.697), perceived quality (0.724), and brand awareness (0.791). The effects of brand awareness, perceived quality, and brand loyalty on purchasing behavior were calculated as 0.820, 0.740, and 0.680, respectively, highlighting them as three key factors in understanding purchasing behavior.

Although not initially within the study's scope, the model also revealed that brand awareness affects perceived quality and that perceived quality contributes to brand loyalty.

CONCLUSION and DISCUSSION

The level of agricultural mechanization in Türkiye holds critical importance for sustainable production and increased productivity. This study provides data that reveals farmers' attitudes toward technology and their brand preferences, thereby offering insights into the development of public policies aimed at enhancing the diffusion of technology. Furthermore, it presents guiding results for domestic manufacturers operating in the agricultural machinery sector in terms of target market segmentation, product positioning, and brand management. This study aims to contribute to a better understanding of consumer behavior in Türkiye's agricultural machinery sector by examining the relationships between consumer innovativeness and key brand equity components—brand awareness, perceived quality, and brand loyalty. The results indicate that consumer innovativeness directly enhances brand awareness, perceived quality, and brand loyalty, while also indirectly influencing purchasing behavior through these factors. In this context, the study highlights that introducing innovative products not only meets evolving consumer demands but also reinforces brand loyalty and competitive advantage. Consumer innovativeness thus serves as a strategic guide for firms in product development and plays a critical role in shaping brand perception. Moreover, the study emphasizes how brands can transform their engagement with target audiences, particularly in an era where digital platforms and social media empower consumers to rapidly access information about brands and products.

Consumer innovativeness is a critical variable that reflects individuals' attitudes toward new products and technologies, their willingness to learn, and their trial behaviors. In this context, in a sector such as agricultural machinery, which is open to technological developments, innovative consumers are not only the first users of new products but also pioneers of industry transformation. The findings of the study indicate that this consumer group forms strong connections with the key elements that constitute brand value. Innovative individuals make more informed decisions, closely follow brand attributes, and demonstrate greater loyalty to the brands they are satisfied with. This study, conducted with farmers operating in the Kırşehir region, reveals that participants aged 30-49 are more innovative compared to other age groups. Similarly, higher education graduates exhibit more innovative behaviors than those with a secondary education. These findings are consistent with Rogers's (1983) *Diffusion of Innovations Theory*, which asserts that individuals with higher education, better access to information, and broader social networks are more likely to adopt innovations early. The greater innovativeness observed in the 30–49 age group may stem from their more active involvement in production processes and a higher tendency to engage with technology. Conversely, the lower innovativeness of the 18–29 age group may be due to limited experience in

agricultural decision-making and restricted access to financial resources. These demographic differences offer valuable guidance for companies aiming to segment their target market. Marketing strategies tailored to younger and less innovative segments, especially those that raise awareness and simplify the use of new technologies, may help boost adoption rates in the long term. The model developed through confirmatory and exploratory analyses shows that consumer innovativeness has strong and significant effects on brand awareness, perceived quality, and brand loyalty. Additionally, it was found that all three of these factors significantly influence purchase behavior. The model also revealed that brand awareness affects perceived quality, and perceived quality in turn influences brand loyalty. These results indicate that consumer innovativeness plays a central role not only as an individual characteristic but also in shaping brand perception and guiding purchase behaviors. For brands operating in the agricultural machinery sector, this underscores the importance of understanding innovative consumer profiles and developing marketing strategies tailored to these profiles.

The findings reached in this study largely align with the existing literature. Consistent with Im et al. (2003) and Steenkamp and Gielens (2003), our findings affirm the positive influence of consumer innovativeness on brand equity. Even in a sector with more rational and high-cost products like agricultural machinery, the increase in brand awareness due to innovation reveals that consumers show more attention and interest towards innovative products. Additionally, the effects on perceived quality and brand loyalty indicate that innovative individuals structure their experiences with brands in a more meaningful way. This suggests that, particularly for innovative consumers, the relationship between product quality and trust in the brand becomes more critical.

Another important finding of the study is that the components of brand value directly influence purchasing behavior. This result supports Aaker's (1991) brand value model and reveals that factors such as brand awareness, perceived quality, and brand loyalty are not only crucial in brand building but also in actual purchase decisions. Furthermore, the impact of brand awareness on perceived quality and perceived quality on brand loyalty shows that brand value has a hierarchical and interactive structure within itself. This result is also consistent with Keller's (1993) brand knowledge model.

The detection of significant differences in consumer innovativeness based on age and education level is consistent with Rogers's (1983) Diffusion of Innovations Theory. In particular, younger and more educated individuals tend to adopt innovations more quickly, contributing to the identification of open technology user profiles in the agricultural sector. In this context, it can be said that companies operating in the agricultural machinery sector need to develop more effective segmented strategies by considering these demographic characteristics in their marketing and communication strategies.

Koçkaya (2022), in a pioneering study in the domestic literature on the branding processes of agricultural equipment, identified brand as a significant factor in purchasing decisions and emphasized the importance of innovation not only in product development but also in the branding process. The results obtained in this study reveal important areas regarding decision-making processes in the agricultural equipment sector by revealing how innovative products affect consumer perception and brand loyalty, and show how consumer innovation, when combined with brand loyalty, shapes purchasing decisions.

Based on the findings of this study, several recommendations are presented for companies operating in the agricultural machinery sector, policymakers, marketing experts, and researchers. Firstly, as indicated by the statistical analysis results, brand awareness (0.82) emerges as the most influential variable on brand value, followed by perceived quality (0.74) and brand loyalty (0.68). This outcome highlights the critical role of awareness creation as a marketing strategy. Therefore, companies should prioritize strategies aimed at increasing brand awareness. In product categories that require high investments, such as agricultural machinery, brand recognition strengthens consumer trust and directly impacts purchasing decisions. In this context, industry trade fairs, digital platforms, and local agricultural consultancy channels should be used effectively. At the same time, communication strategies for perceived quality should be strengthened, with clear emphasis on product durability, service networks, and technical support advantages.

It is essential to emphasize that age and education level are crucial factors in target audience segmentation. Individuals aged 30-49 are more willing and inclined to adopt agricultural innovations. Educational initiatives and promotional activities aimed at this age group will facilitate faster acceptance of innovative products. Incentives such as additional service discounts for innovative farmers (age group 30-49) can increase the pace of adoption. Technological innovations in products should be presented in a simple and comprehensible manner, and creative marketing strategies, such as virtual reality applications, social media campaigns, and influencer partnerships, should be adopted, particularly targeting the younger and more educated farmer segment, as they are effective in creating brand awareness.

The impact of education level on innovation adoption should also not be overlooked. Highly educated individuals are more likely to adopt innovative agricultural equipment and demonstrate a more analytical approach in the

process. Therefore, companies should offer technical content and educational programs tailored to educated consumers. Furthermore, collaborations with early adopters in this group will help create effective marketing strategies for other segments.

Brand awareness stands out as one of the most powerful factors in creating brand value. Therefore, companies should prioritize advertising and marketing strategies to promote their products. Digital platforms and agricultural trade fairs can help companies establish effective communication. Farm equipment companies can increase brand awareness by hosting 'How It Works' videos, farmer testimonials, and live Q&A sessions on social media like Instagram and YouTube. However, strategies regarding distribution channels, such as establishing closer relations with farmers and local dealer networks, organizing demo tours for innovative products, and allowing farmers to try out the machines and see the technical features on site, will have an impact on increasing customer confidence. Pricing strategies such as flexible payment plans that fit farmers' budgets, opportunities to benefit from local incentives, and financing options offered through the banking system will also have an impact on increasing brand awareness.

To foster brand loyalty, post-sale service quality should be improved, loyalty programs should be developed, and feedback mechanisms based on user experiences should be established, thereby building long-term relationships with customers. Considering that previous positive experiences strongly influence brand loyalty, ensuring the sustainability of these experiences is essential.

Consumer innovativeness strengthens purchasing behavior through its impact on brand value. Companies should increase research and development investments and introduce innovative products to the market by improving existing products. Considering geographical differences, such as disc harrows or models suitable for soil structure, will contribute to creating a difference in regional markets. Also, implementing product development programs based on consumer feedback will enhance customer satisfaction and contribute to the innovation process. By collecting machine usage data with IoT sensors, interactions such as providing farmers with customized maintenance reminders or productivity analytics can strengthen brand loyalty.

Lastly, to accelerate the adoption of innovative products, practical initiatives such as training programs and field trials are recommended. Additionally, offering strong after-sales support will improve brand perception and increase customer satisfaction. In a digitalized world, companies should promote their innovative products through personalized marketing strategies on digital platforms.

The study's limitations were outlined in the methodology section. However, it is important to note that this research was conducted with farmers in Kırşehir and centered on specific product groups. The sample size was determined as 306 individuals with a 5% confidence level, and participants were selected using a random method. Age and education were chosen as demographic variables that could be more easily generalized. Moreover, the statistical methods used and the explanatory power of the model positively contribute to the generalizability of the study's results. Nevertheless, broader studies including different demographics, geographical areas, and product categories may produce different outcomes. The use of face-to-face surveys may have introduced social desirability bias. Future research using alternative measurement tools might yield varied results. Furthermore, as the study was conducted in 2024, consumer behavior may have evolved over time. Macroeconomic and technological factors that influence innovation adoption, such as rising prices or shifts in consumer priorities, were not extensively addressed. Similarly, government incentives for agricultural equipment purchases were not incorporated into the research model. The R^2 values from the model also suggest that additional variables may influence consumer behavior.

For future research, several directions can be recommended. The fact that this study is limited to the province of Kırşehir limits the ability of the results to represent all agricultural producers in Turkey. Since the socioeconomic structure of the region, types of agricultural activities, and machinery usage habits may differ, direct generalization of the findings to other regions should be considered carefully. In future studies, it will be possible to reach more holistic results by including different geographical regions. Studies conducted in different regions and with diverse farming communities and cultures may offer new perspectives. Replicating the findings in wider samples would enhance the generalizability of the results. Longitudinal studies could be used to observe changes over time in the relationship between consumer innovativeness and brand equity. In addition to survey methods, experimental designs may help assess the effects of specific marketing strategies or communication techniques. Future studies may incorporate socioeconomic variables, such as farm size, income, and access to credit, into the model as control variables. Furthermore, exploring the mediating role of perceived quality or the moderating effects of demographic factors like education level could lead to a more comprehensive understanding of the model. The research focused only on soil processing machines. However, it is evaluated that other agricultural machines such as tractors, harvesters, spraying, and irrigation systems that appeal to different areas of use may also create different perceptions in terms of consumer innovation. Therefore, including these product groups in the model in

future research will allow for a more comprehensive evaluation. Although the study structures the components of brand equity based on Aaker's classic model, the findings show that the effects of brand awareness and perceived quality on purchase behavior align with contemporary studies (e.g., Keller & Lehmann, 2003). Additionally, contemporary literature highlights new elements such as digital touchpoints (Christodoulides & de Chernatony, 2010) and consumer productivity. However, due to the unique conditions of the agricultural sector, this research does not cover new-generation brand equity factors such as social media influence and user reviews. This also reveals the application limitations of the study within the sector context. In sectors dominated by rational decisions, like agricultural equipment, the impact of these contemporary factors may be limited; nonetheless, with future digitalization, these variables could also be integrated into the model. Finally, incorporating psychological traits such as risk-taking and willingness to learn, as well as economic variables like income and investment orientation, would enrich the theoretical and practical contributions of future studies in this area.

Contribution Rate Statement Summary of Researchers

Literature review, ethics committee process, writing stage, translation, survey design, statistical analysis, language expression checks, publication process were carried out by the corresponding author. The second author carried out only the collection of data from the field.

Conflict of Interest

The authors of the articles declare that they have no conflict of interest.

Ethics Statement

Ethics Committee Approval for this study was obtained from the Kırşehir Ahi Evran University Social and Human Sciences Scientific Research and Publication Ethics Committee with the decision dated 08.01.2025 and numbered 2025/01/36.

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