



Mediating Role of Nashāt in Enhancing Innovation and Farmer Productivity

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Abstract

Despite growing research on agricultural innovation, limited empirical evidence explains how cognitive and social determinants are translated into sustained productivity outcomes, particularly within Islamic socio-cultural contexts where value-based motivation may play a critical role. Existing models largely emphasize external factors while overlooking internalized work ethics that drive consistent innovative behavior. This study addresses this gap by examining the mediating role of Nashāt a construct reflecting enthusiasm, diligence, and proactive work ethic in linking innovation attitude, subjective norms, and perceived innovation attributes to the innovation-productivity performance of food-crop farmers in Bone Regency, Indonesia. Using an explanatory quantitative approach, data from 150 farmers were analyzed through PLS-SEM (SmartPLS 4.0). The findings reveal that Nashāt exerts a significant direct effect on innovation and productivity and fully mediates the influence of cognitive and social factors, indicating that such factors must be internalized into sustained work motivation before generating measurable productivity gains. These results extend behavioral models of agricultural innovation by integrating Islamic value-based constructs and highlight the strategic importance of strengthening farmers' intrinsic motivation through targeted extension and policy interventions.

Keywords:

Nashāt;
agricultural
innovation;
innovation
attitude;
subjective
norms;
farmer
productivity

Abstrak

Meskipun penelitian tentang inovasi pertanian terus berkembang, bukti empiris yang menjelaskan bagaimana faktor kognitif dan sosial diterjemahkan menjadi hasil produktivitas yang berkelanjutan masih terbatas, khususnya dalam konteks sosio-kultural Islam di mana motivasi berbasis nilai berpotensi memainkan peran penting. Model yang ada umumnya menekankan faktor eksternal dan mengabaikan etos kerja yang terinternalisasi sebagai pendorong perilaku inovatif yang konsisten. Penelitian ini mengisi kesenjangan tersebut dengan menguji peran mediasi Nashāt sebuah konstruk yang mencerminkan semangat, ketekunan, dan etos kerja proaktif dalam menghubungkan sikap terhadap inovasi, norma subjektif, dan persepsi terhadap atribut inovasi dengan kinerja inovasi-produktivitas petani tanaman pangan di Kabupaten Bone, Indonesia. Menggunakan pendekatan kuantitatif eksplanatori, data dari 150 petani dianalisis dengan PLS-SEM (SmartPLS 4.0). Hasil penelitian menunjukkan bahwa Nashāt memiliki pengaruh langsung yang signifikan terhadap inovasi dan produktivitas serta berperan sebagai mediator penuh, yang berarti faktor kognitif dan sosial harus terlebih dahulu terinternalisasi menjadi motivasi kerja yang berkelanjutan sebelum menghasilkan peningkatan produktivitas yang terukur. Temuan ini memperluas model perilaku inovasi pertanian dengan mengintegrasikan konstruk berbasis nilai Islam serta menegaskan pentingnya penguatan motivasi intrinsik petani melalui program penyuluhan dan intervensi kebijakan yang terarah.

Kata

kunci:
Nashāt;
inovasi
pertanian;
sikap inovasi;
norma
subjektif;
produktivitas
petani.



Introduction

Nashāt plays a crucial role in enhancing innovation and productivity among food-crop farmers. Farmers who demonstrate strong enthusiasm and high initiative tend to adopt modern technologies more rapidly technologies that save time and labor while improving crop yields(Balogh et al., 2020; Nguyen et al., 2024). Such motivation also fosters more efficient farm management, discipline, and preparedness in responding to weather fluctuations and pest outbreaks(Montes de Oca Munguia et al., 2021; Rizzo et al., 2024). In addition, *Nashāt* encourages farmers to engage more actively in networking, participate in training programs, and utilize digital media for marketing, thereby expanding market access and increasing profitability(Ruzzante et al., 2021). Thus, *Nashāt* is not merely a work motivation factor but a driving force for tangible transformation, enabling farmers to become more productive, adaptive, and self-reliant in facing the challenges of modern agriculture(Tsambou & Tagang Tene, 2024).

Research on the mediating role of *Nashāt* in strengthening innovation and productivity among food-crop farmers remains notably limited, even though previous studies have connected this construct to work ethic, spirituality, and social interaction across various contexts. Existing evidence indicates that *Nashāt* enhances competitiveness, persistence, and innovative capability by fostering enthusiasm, diligence, and a strong work ethic(Han et al., 2022). Studies rooted in spiritual motivation further reveal that religious commitment and spiritual energy cultivate *Nashāt* as a powerful internal driver that reinforces discipline, focus, and sustained productivity(Abdul-Majid et al., 2024). Complementary research on tradition and social interaction also shows that *Nashāt* stimulates innovative and productive collective behavior through cultural preservation, strengthened social cohesion, and the integration of digital technologies to broaden collaborative networks(B. Liu et al., 2024; Yang et al., 2023; Yeo & Keske, 2024).

Despite this growing body of literature, empirical studies explicitly linking this spiritual value to innovation and productivity among food-crop farmers remain scarce(Giroux et al., 2023; Tanko & Ismaila, 2021). The limited exploration of how *Nashāt* shapes farmers' willingness to adopt modern technologies, refine cultivation practices, or generate new agricultural innovations leaves a significant gap in understanding the internal mechanisms that drive adaptive and future-oriented behavior(Tanko, 2022; Tanko et al., 2023). This gap underscores the need for deeper empirical inquiry to clarify the mediating function of *Nashāt* and to leverage Islamic values as foundational



motivational resources for enhancing productivity, resilience, and sustainability within the agricultural sector(Chu et al., 2025).

This study employs two key theoretical frameworks to explain the mediating role of *Nashāt* in enhancing innovation and productivity among food-crop farmers. The Theory of Planned Behavior suggests that farmers' innovative behavior arises from intentions shaped by attitudes, social norms, and perceived behavioral control(Suryanto et al., 2020). Meanwhile, the Innovation Diffusion Theory notes that innovation adoption progresses through knowledge, persuasion, decision, implementation, and confirmation, with compatibility and ease of use facilitating uptake(Dessart et al., 2019). Within this combined framework, *Nashāt* acts as a mediating force that strengthens farmers' motivation and proactive engagement in learning and applying new innovations(Mwangi & Kariuki, 2015). Together, these theories illustrate how psychological and social factors synergistically drive behavioral change among farmers(Lang et al., 2019).

This study aims to address the existing gap in research concerning the mediating role of *Nashāt* in fostering innovation and productivity among food-crop farmers(Adnan et al., 2025; Rosário et al., 2022). It examines how *Nashāt* mediates the relationships between innovation attitude, subjective norms, and perceived innovation attributes, while also assessing its direct influence on innovation and productivity(Dai & Cheng, 2022; Okello et al., 2019). As a value reflecting enthusiasm, proactiveness, and a strong work ethic, *Nashāt* is considered a key driver of farmers' innovative behavior. An empirical approach is employed to explore the psychological and social mechanisms underlying innovation(Yazdanpanah et al., 2014). The findings are expected to strengthen the conceptual foundation of internal factors that enhance productivity and to produce a conceptual model applicable to modern agricultural contexts.

Literature Review

Theoretical Foundation

The Theory of Planned Behavior (TPB), developed by Icek Ajzen, posits that human behavior is primarily driven by intention, which arises from three components: attitudes toward the behavior, subjective norms, and perceived behavioral control(Hou & Hou, 2019). In agricultural settings, these components influence farmers' decisions to adopt new technologies, while the value of *Nashāt* may function as a mediating factor that strengthens the link between intention and actual behavior by enhancing motivation and active



engagement. Meanwhile, Rogers' Diffusion of Innovation Theory explains how new ideas or technologies are adopted within a social system through communication over time, with adoption rates shaped by relative advantage, compatibility, complexity, trialability, and observability. Farmers who embody *Nashāt* often represent early adopters, displaying openness and readiness to embrace innovation (T. Liu et al., 2018). Taken together, both theories offer a comprehensive framework for understanding the psychological and social determinants of farmers' innovative behavior and their subsequent impact on agricultural productivity.

***Nashāt* and Farmers' Innovation Productivity**

Nashāt shows a strong linkage to farmers' innovative productivity by integrating spiritual values with work-oriented behavior. It acts as an internal positive drive that fosters diligence, discipline, and consistency in agricultural activities (Dessart et al., 2019). As an expression of Islamic work ethic, *Nashāt* motivates farmers to pursue innovation, adopt new technologies, and seek more efficient production methods (Miao et al., 2021). Within the Theory of Planned Behavior (TPB), it aligns with perceived behavioral control, reflecting farmers' confidence in managing challenges. Higher levels of *Nashāt* enhance risk-taking willingness, strengthen self-efficacy, and support sustained application of innovative practices. Consequently, *Nashāt* becomes a crucial mechanism that converts innovative intentions into tangible improvements in agricultural productivity (Rezaei et al., 2018).

H1: *Nashāt* has a significant influence on farmers' innovation and productivity.

Innovation Attitude and *Nashāt*

Innovation attitude represents an individual's disposition toward new ideas or technologies and shapes farmers' openness to change and willingness to adopt more efficient methods (Gemtou et al., 2024). In agriculture, a strong innovation attitude fosters adaptability, curiosity, and proactive problem-solving, forming the basis for continuous improvement in farming practices (Dessart et al., 2019). *Nashāt*, understood in Islamic teachings as enthusiasm and earnestness driven by spiritual intention, promotes honesty, discipline, and responsibility in work (Li et al., 2023). When innovation attitude is reinforced by *Nashāt*, spiritual motivation strengthens the desire to change and supports the adoption of new practices (Russo et al., 2025). The synergy between these two constructs encourages sustained improvements in



productivity, with *Nashāt* functioning as an amplifying force that strengthens the link between innovative attitudes and actual innovation adoption (Knitsch et al., 2024).

H2: Innovation attitude has a significant influence on *Nashāt*.

Subjective Norms and *Nashāt*

Subjective norms refer to an individual's perception of social pressure to perform or avoid certain behaviors, typically originating from family members, peers, or community leaders (Waiswa et al., 2025). In the context of work and innovation, these norms play a crucial role in shaping individual motivation. When the social environment emphasizes work ethic, responsibility, and achievement, individuals are more likely to engage in productive behaviors (Ren et al., 2022). Such social support strengthens one's commitment to performance and positive change. In Islamic teachings, *Nashāt* represents enthusiasm and earnestness in work grounded in spiritual values. The relationship between the two becomes evident when positive social norms are internalized as an inner drive toward self-improvement. Constructive norms foster *Nashāt* as an internal source of energy, which in turn reinforces innovative and productive behavior in the workplace (B. Liu et al., 2024).

H3: Subjective norms have a significant influence on *Nashāt*.

Perceived Innovation Attributes and *Nashāt*

Perceived innovation attributes reflect how individuals evaluate the characteristics of an innovation, including relative advantage, value compatibility, complexity, trialability, and observability (Lee et al., 2021). Positive perceptions of these attributes increase the likelihood of innovation adoption. For food-crop farmers, favorable views regarding the benefits and ease of agricultural innovations serve as key determinants in changing farming practices (Strong et al., 2022). In Islamic teachings, *Nashāt* represents enthusiasm, proactiveness, and earnestness in work. Individuals with high levels of *Nashāt* tend to be more open to new opportunities, and this internal drive strengthens the influence of perceived innovation attributes on actual behavior. When innovations are perceived as advantageous, *Nashāt* encourages consistent implementation. Thus, *Nashāt* functions as an amplifying factor in the innovation adoption process.

H4: Perceived innovation attributes have a significant influence on *Nashāt*.



***Nashāt* as a Mediator**

Innovation attitude, subjective norms, and perceived innovation attributes are key factors influencing farmers' innovative behavior (Rizzo et al., 2024). Innovation attitude reflects farmers' views on the benefits of change, while subjective norms capture social influences from family members, community leaders, and farmer groups (Zondo & Ndoro, 2023). Perceived innovation attributes relate to farmers' evaluations of the ease, compatibility, and advantages of a given innovation (Strong et al., 2022). However, these three factors do not always translate directly into increased productivity. This is where *Nashāt* plays a critical role as an internal driving force. *Nashāt*, understood as work enthusiasm and earnestness grounded in spiritual values, enables farmers to transform intention into concrete action. With this internal energy, farmers are encouraged to innovate diligently and consistently.

H5: *Nashāt* mediates the relationship between: (a) innovation attitude, (b) subjective norms, and (c) perceived innovation attributes and farmers' productivity.

Method

This study employs an explanatory quantitative approach grounded in an Islamic economics perspective to examine the causal relationships among Innovation Attitude, Subjective Norms, Perceived Attributes of Innovation, *Nashāt*, and farmers' Innovation-Productivity Performance in Bone Regency. The explanatory design is intended to test hypothesized causal linkages and to evaluate the mediating function of *Nashāt* in translating psychological and social determinants into measurable innovation and productivity outcomes.

Data were analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. PLS-SEM was selected due to its suitability for predictive-oriented research, complex structural relationships involving mediation effects, moderate sample sizes, and its robustness against non-normal data distributions. Moreover, this approach is appropriate for testing and validating relatively underexplored constructs such as *Nashāt* within a structural model framework. The analytical model specifies Innovation-Productivity Performance as the endogenous variable influenced by Innovation Attitude, Subjective Norms, and Perceived Attributes of Innovation, with *Nashāt* functioning as a mediating construct. Conceptually, *Nashāt* representing vitality, diligence, and proactive work enthusiasm strengthens the linkage between innovation-related cognition and productive



agricultural behavior. Integrating Islamic economic principles, the framework posits that spiritually grounded motivation embodied in values such as responsibility, perseverance, and ethical commitment serves as a foundational driver of sustainable agricultural performance.

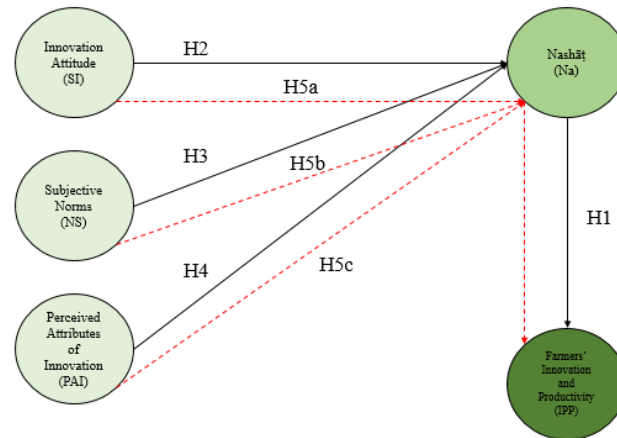


Figure 1. The analytical model of study

Source: The authors' own work, 2025

This study employs a structured questionnaire as the research instrument, which is organized into two main sections. The first section outlines the objectives of the study and gathers respondents' demographic information, including age, length of farming experience, educational attainment, land ownership status, and participation in farmer groups. The second section consists of 15 statements measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). These statements represent five core constructs Attitude Toward Innovation, Subjective Norms, Perceived Attributes of Innovation, *Nashāt*, and Farmers' Innovation Productivity each operationalized through three indicators and developed based on the operational variable framework formulated in this study.

Data were gathered over a three-month period, spanning from early February to late April 2025, by applying a cluster-based sampling technique across several agricultural areas in Bone Regency, South Sulawesi, Indonesia. The study involved 150 food-crop farmers as respondents, who were selected according to specific criteria, including a minimum of two years of farming experience, active participation in farmer groups, and engagement in productive and innovation-oriented agricultural practices. This number of respondents is considered adequate, as it meets the minimum sample size requirements proposed by Hair et al. (2010), which recommend at least ten respondents per indicator, and is further supported by Kyriazos (2018) and

Schermelleh-Engel et al. (2003) to ensure the stability and reliability of PLS-SEM model estimations.

Data analysis was conducted using SmartPLS version 4.0 and carried out in two main stages (Sulistyowati et al., 2024). In the initial stage, the analysis focused on the evaluation of the measurement model (outer model) by examining the validity and reliability of the constructs. This evaluation was conducted using factor loadings, Composite Reliability, Cronbach's Alpha, Average Variance Extracted (AVE), and discriminant validity criteria (Hair et al., 2024). In the subsequent stage, the analysis concentrated on evaluating the structural model (inner model) to examine the relationships proposed in the hypotheses. This evaluation was conducted by considering R-square values, F-square effect sizes, and path coefficients, with statistical significance determined at the $p < 0.05$ level (Zeng et al., 2021). This analytic framework enabled the assessment of both direct and indirect effects, including the mediating role of *Nashāt* in strengthening the influence of farmers' psychological and perceptual factors on innovation adoption and productivity outcomes in Bone, South Sulawesi (Sobaih & Elshaer, 2022).

Results

Demographic Profile of Respondents

Tabel 1. Demographic Profile of the Respondents

Criteria/Category	Frequency	Percentage(%)
Gender		
Male	86	55,1 %
Female	70	44,9 %
Age		
20 – 30 years	87	55,8 %
31 – 40 years	42	26,9 %
41 – 50 years	21	13,5 %
51 – 60 years	5	3,2 %
Di atas 60 years	1	0,6 %
Marital Status		
Unmarried	82	52,6 %
Married	74	47,4 %
Educational Background		
Senior High School or Equivalent	110	70,5 %
Diploma	5	3,2 %
Bachelor's Degree (S1)	39	25 %
Others	2	1,3 %
Occupation		



Criteria/Category	Frequency	Percentage(%)
Lecturer/Teacher	4	2,6 %
Government/Private Employee	4	2,6 %
Entrepreneur/Trader	5	3,2 %
Farmer	91	58,3 %
Others	52	33,3 %
Monthly Income		
Below IDR 1 million	18	11,5 %
IDR 1–2 million	38	24,4 %
Above IDR 2-3 million	35	22,4 %
Above IDR 3 million	25	16 %
Uncertain	40	25,6 %

(Source: Primary data processed in 2025)

Based on the demographic analysis of 156 respondents, the findings indicate that the sample was predominantly male, accounting for 55.1%, and largely fell within the productive age group of 20–30 years (55.8%). More than half of the respondents were unmarried (52.6%) and had completed senior high school or an equivalent level of education (70.5%). In terms of occupation, agriculture represented the primary livelihood for the majority of respondents (58.3%), while income levels varied, with the largest proportion classified as having irregular earnings (25.6%). Overall, the respondent profile reflects a predominance of young adults with mid-level educational attainment and a strong dependence on the agricultural sector.

Measurement Model Assessment

As shown in Table 2, all constructs in the model satisfy the criteria for convergent validity and reliability. This is evidenced by the Cronbach's Alpha and Composite Reliability values for each variable, all of which exceed the 0.70 threshold, indicating a high level of internal consistency. In addition, the Average Variance Extracted (AVE) values, ranging from 0.785 to 0.808, are substantially above the minimum recommended level of 0.50, suggesting that more than 78% of the variance in each construct is explained by its indicators. Accordingly, all constructs are deemed valid and reliable for subsequent analyses.

Table 2. Validity and Reliability Test Results

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)



Farmers' Innovation and Productivity	0.879	0.881	0.925	0.805
Subjective Norms	0.881	0.882	0.927	0.808
<i>Nashāt</i>	0.876	0.878	0.924	0.802
Perceived Attributes of Innovation	0.876	0.878	0.924	0.802
Innovation Attitude	0.863	0.864	0.916	0.785

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 3. Outer Loadings

Variables/ Indicators	Farmers' Innovation and Productivity	Subjective Norms	<i>Nashāt</i>	Perceived Attributes of Innovation	Innovation Attitude
IPP1	0.899				
IPP2	0.887				
IPP3	0.905				
NS1		0.896			
NS2		0.894			
NS3		0.907			
Na1			0.893		
Na2			0.873		
Na3			0.919		
PAI1				0.888	
PAI2				0.893	
PAI3				0.905	
SI1					0.883
SI2					0.894
SI3					0.881

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 3, the outer loading values of each indicator on their respective latent variables confirm that the research instrument satisfies the criteria for convergent validity. All indicators exhibit loading values above the 0.70 threshold, indicating a strong and meaningful contribution of each item to its corresponding construct. For the Farmer Productivity Innovation (IPP) construct, indicators IPP1–IPP3 demonstrate loading values ranging from 0.887 to 0.905. Likewise, the Subjective Norm (NS) construct, measured by indicators NS1–NS3, shows consistently high loadings between 0.894 and 0.907. The *Nashāt* (Na) construct is also supported by robust indicator loadings, ranging from 0.873 to 0.919. In addition, indicators PAI1–PAI3 for the Perception of Innovation (PAI) construct present loading values



between 0.888 and 0.905, while the Innovation Attitude (SI) construct, assessed through indicators SI1–SI3, exhibits loadings from 0.881 to 0.894. Overall, these findings affirm that all indicators meet the reliability requirements for construct measurement within the Partial Least Squares (PLS) model.

Table 4. Fornell-Larcker Criterion

Variables	IPP	NS	Na	PAI	SI
Farmers' Innovation and Productivity	0.897				
Subjective Norms	0.836	0.899			
<i>Nashāt</i>	0.814	0.825	0.895		
Perceived Attributes of Innovation	0.852	0.839	0.821	0.895	
Innovation Attitude	0.780	0.771	0.807	0.805	0.886

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 4, all constructs in the model fulfill the Fornell–Larcker criterion for discriminant validity. This is evidenced by the square root of the AVE for each construct, shown along the diagonal, being greater than the correlations with other constructs, which confirms that each variable explains its own indicators more strongly than those of other constructs. For instance, the square root of the AVE for Farmer Productivity Innovation (0.897) and Subjective Norms (0.899) exceeds the correlation between the two constructs, as reflected in the IPP–NS correlation value of 0.836. The same pattern is consistently observed across all constructs, providing robust evidence that the model has achieved adequate discriminant validity.

Table 5. R-Square and Adjusted R-Square Values

Variables	R-square	R-square adjusted
Farmers' Innovation and Productivity	0.663	0.661
<i>Nashāt</i>	0.769	0.764

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 5, the research model explains 66.3% of the variance in Farmer Productivity Innovation, as indicated by an R-square value of 0.663 and an adjusted R-square of 0.661. In contrast, the *Nashāt* variable records an R-square of 0.769 with an adjusted value of 0.764, demonstrating that 76.9% of its variance is accounted for by the model. These findings underscore the strong predictive capability of the model for both endogenous variables.

Table 6 summarizes the f-square (f^2) values, illustrating the magnitude of each independent variable's effect within the model. *Nashāt* exhibits the strongest influence on Farmer Productivity Innovation, with an f^2 value of 1.967, indicating a very large effect. Perception of Innovation demonstrates a moderate effect, with an f^2 value of 0.070, while Innovation



Attitude and Subjective Norms show smaller yet meaningful effects of 0.140 and 0.151, respectively. Overall, these findings highlight Nashāt as the dominant predictor in the model, whereas the other variables contribute additional, more moderate influences to the enhancement of farmer productivity innovation.

Table 6. F-Square Values

Variables	IPP	NS	Na	PAI	SI
Farmers' Innovation and Productivity					
Subjective Norms			0.151		
<i>Nashāt</i>	1.967				
Perceived Attributes of Innovation			0.070		
Innovation Attitude			0.140		

(Source: Primary data processed by using SmartPLS 4, 2025)

Structural Model Assessment

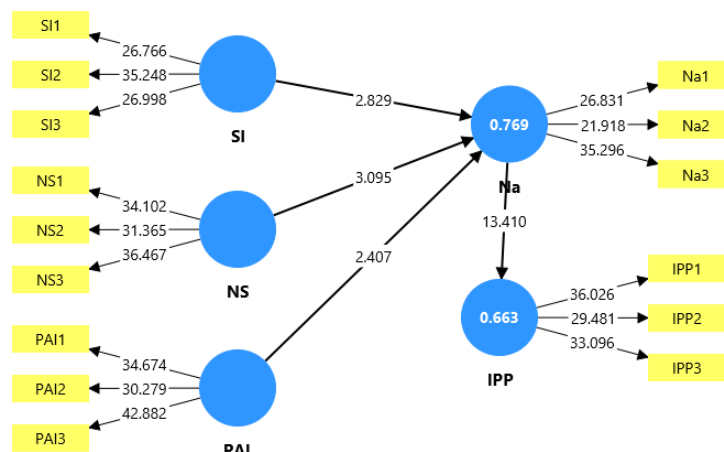


Figure 2. Output of the structural model testing

Source: Primary data processed by using SmartPLS 4, 2025

As illustrated in Figure 2 and summarized in Table 7, the structural analysis reveals several significant relationships within the model. Nashāt demonstrates a very strong effect on Farmer Productivity Innovation, with a path coefficient of $\beta = 0.814$. In addition, Subjective Norms exert a significant influence on Nashāt ($\beta = 0.359$), followed by Innovation Attitude ($\beta = 0.318$) and Perception of Innovation ($\beta = 0.264$). These results underscore the importance of social support, innovative attitudes, and positive perceptions of innovation in enhancing farmers' productive activities through the mediating role of Nashāt. The robustness of the model is further supported by the high levels of reliability and validity achieved across all constructs.

Table 7. SEM-PLS: Direct Effect Testing Results

	Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
H1	<i>Nashāt</i> → Farmers' Innovation and Productivity	0.814	0.807	0.061	13.410	0.000
H2	Innovation Attitude → <i>Nashāt</i>	0.318	0.297	0.112	2.829	0.005
H3	Subjective Norms → <i>Nashāt</i>	0.359	0.388	0.116	3.095	0.002
H4	Perceived Attributes of Innovation → <i>Nashāt</i>	0.264	0.255	0.110	2.407	0.017

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 8. SEM-PLS: Indirect Effect Testing Results

	Variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
H5a	Innovation Attitude → <i>Nashāt</i> → Farmers' Innovation and Productivity	0.259	0.240	0.092	2.812	0.006
H5b	Subjective Norms → <i>Nashāt</i> → Farmers' Innovation and Productivity	0.292	0.312	0.094	3.111	0.002
H5c	Perceived Attributes of Innovation → <i>Nashāt</i> → Farmers' Innovation and Productivity	0.215	0.208	0.095	2.271	0.025

(Source: Primary data processed by using SmartPLS 4, 2025)

Table 8 shows three significant mediation pathways within the model. First, Perception of Innovation exhibits an indirect effect on Farmer Productivity Innovation through *Nashāt* ($\beta = 0.215$, $t = 2.271$, $p = 0.025$), suggesting that favorable perceptions of innovation facilitate increased productive engagement among farmers. Second, Innovation Attitude also



demonstrates a significant indirect effect through *Nashāt* ($\beta = 0.259$, $t = 2.812$, $p = 0.006$), underscoring that openness to new ideas and technologies contributes to greater involvement in productive activities. Third, Subjective Norms contribute the strongest indirect effect through *Nashāt* on Farmer Productivity Innovation ($\beta = 0.292$, $t = 3.111$, $p = 0.002$), indicating that social endorsement and environmental support reinforce farmers' participation in innovative activities. Overall, these findings affirm *Nashāt* as a key mediator linking psychological and social factors to improvements in farmer productivity innovation.

The mediation results indicate that *Nashāt* functions as a full mediator in enhancing farmer productivity innovation. The indirect effects show that Innovation Attitude, Subjective Norms, and Perception of Innovation influence productivity solely through *Nashāt*, with no significant direct pathways. This suggests that social encouragement and positive perceptions must first be translated into productive activity before generating tangible innovation outcomes. *Nashāt* serves as the primary mechanism that transforms internal values and readiness into concrete action. These findings highlight that improvements in farmer productivity are driven mainly by internalization and active engagement rather than external pressure. Accordingly, the model clearly demonstrates full mediation.

Discussion

Within the epistemological framework of the Theory of Planned Behavior (TPB), the adoption of agricultural innovations can be understood as a manifestation of intentional processes constructed through attitude, subjective norms, and perceived behavioral control. Empirical findings indicate that these three determinants significantly shape farmers' intentions to adopt innovations attitude ($\beta = 0.312$), subjective norm ($\beta = 0.241$), and perceived behavioral control ($\beta = 0.229$) (Dong et al., 2022). Consistent with Ajzen's (1991) formulation, these results confirm the external validity of TPB and are in line with previous agricultural studies, demonstrating that individual cognitive structures operate through evaluative, normative, and self-control mechanisms that jointly form intentions (Dong et al., 2022). In the context of agriculture in Bone Regency, the decision to adopt innovations is not a spontaneous reaction but the outcome of systematic cognitive calculations, guided by perceived benefits,



personal capability, and social expectations within the farming community(Zhang et al., 2024).

The centrality of intention as a mediating construct within TPB is further reinforced by its substantial effect on actual innovation adoption ($\beta = 0.587$; $p < 0.001$), consistent with prior empirical studies in agricultural contexts(Timpanaro et al., 2023; Yuan et al., 2025). Intention functions as a transitional mechanism that transforms cognitive representations into concrete actions, although this study suggests that its effectiveness may vary depending on socio-cultural reinforcement mechanisms. These findings support earlier conclusions that innovation adoption constitutes a psycho-social condition developed through deliberative and normative processes(Irimia-Diéguez et al., 2023; Ključnikov et al., 2025).

From the perspective of Innovation Diffusion Theory (IDT), innovation attributes such as relative advantage ($\beta = 0.298$; $p = 0.001$), compatibility with socio-cultural values ($\beta = 0.256$; $p = 0.003$), and low complexity ($\beta = 0.219$; $p = 0.005$) serve as external determinants that accelerate adoption(Ha et al., 2023; Kaine & Wright, 2022; Rosário et al., 2022). The present findings corroborate these studies, confirming that innovations offering higher benefits, aligning with community norms, and being easily understood are more rapidly accepted. The integration of TPB and IDT demonstrates that farmers' innovative behavior results from the interaction between cognitive appraisal, social expectations, and technical characteristics of innovations(Montes de Oca Munguia et al., 2021; Tohidyan Far et al., 2025).

Subjective norms and social networks can further be interpreted through Social Identity Theory (SIT), where identification with social groups strengthens intention and accelerates innovation diffusion(Khuraijam et al., 2025; Pronti et al., 2025). Similar to previous findings, community norms and social interactions create collective legitimacy and mediate the relationship between individual intention and behavior(Karbo et al., 2024; Montes de Oca Munguia et al., 2021). In Bone, solidarity and social learning among farmers enhance innovation adoption, indicating that innovative behavior reflects not only individual rationality but also social affiliation and collective commitment(Widiyanti et al., 2023).

Overall, this study underscores that the adoption of agricultural innovations is a multidimensional construct involving the interaction between individual cognitive determinants, technical attributes of innovations, and collective social dynamics(Rezaei et al., 2020). While



consistent with prior theoretical and empirical work, the findings highlight the importance of contextual reinforcement mechanisms in sustaining adoption. Strategies to enhance adoption should therefore integrate cognitive education, supportive social network facilitation, and strengthened institutional capacity to ensure that innovations are collectively accepted and sustainably maintained within agrarian communities (Klerkx et al., 2019).

Conclusion

This study aimed to examine the mediating role of *Nashāt* in linking attitudinal, social, and perceptual determinants to farmers' innovation and productivity performance using an explanatory quantitative design and PLS-SEM analysis. The findings confirm that *Nashāt* serves as a central behavioral mechanism through which these factors are translated into meaningful productivity outcomes. Although innovation attitudes, subjective norms, and perceptions of innovation attributes are theoretically expected to directly influence farmers' performance, the empirical results demonstrate that their effects operate exclusively through *Nashāt*. This full mediation pattern indicates that productivity does not arise solely from favorable cognition or supportive social pressures; rather, it depends on farmers' capacity to internalize these antecedents into sustained engagement, discipline, and productive effort. The study therefore reinforces the theoretical argument that internal activation processes are essential for transforming innovation-related values into tangible agricultural results. Based on these findings, several recommendations are proposed. Agricultural stakeholders should prioritize interventions that strengthen behavioral activation such as work discipline, motivational consistency, and sustained engagement rather than focusing exclusively on innovation dissemination. Extension services are encouraged to cultivate community norms that reinforce *Nashāt*-driven behaviors through continuous mentoring, participatory learning mechanisms, and structured performance monitoring. Policy frameworks should also incorporate behavioral indicators into agricultural evaluation systems to ensure that non-technical drivers of productivity receive adequate attention. Integrating innovation diffusion with behavioral reinforcement can increase the likelihood that technological improvements translate into measurable productivity gains. Nevertheless, this study has limitations. The cross-sectional design restricts the ability to infer long-term causal relationships among psychological determinants, *Nashāt*, and productivity



outcomes. Productivity data based on self-reports may also involve recall bias or subjective overestimation. Furthermore, the geographic focus on selected districts in Bone Regency may limit generalizability to regions with different socio-cultural characteristics. Future research is therefore encouraged to adopt longitudinal or experimental designs, incorporate objective productivity measures, and conduct comparative studies across diverse agricultural contexts to enhance robustness and external validity.

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