RESEARCH ARTICLE

Agribusiness startup among agricultural students: awareness, perception, constraints and students' expectations from the university

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Abstract

This study empirically examines how graduate students' awareness and perception of agribusiness startups influence their intention to start an agribusiness startup, focusing on those factors based on the theory of planned behaviour. To know the constraints that reduce the entrepreneurial intention among the students and their expectations from the university. The study employed a purposive sampling design, involving 211 students from the Agricultural University, Coimbatore. In India, startups have rapidly emerged as the third-largest startup ecosystem in the world, following the USA and China. The results of the study revealed that students possess moderate awareness about agribusiness startups, with an average mean score of 3.64 and entrepreneurial intention was positively influenced by a favourable perception of agribusiness and university support. Major constraints identified that unfair competition from larger market players, with a Garrett mean score of 58.72 and a lack of equity capital Garrett mean score of 58.16, these barriers significantly reduced the confidence and interest of students in starting agribusiness ventures. Students emphasized the need for mentorship programs, interaction with successful agripreneurs and entrepreneurship education as key expectations from their university. The findings suggest that strengthening university support systems and addressing financial barriers could enhance student participation in agribusiness startups.

Keywords: agripreneurship; entrepreneurial intention; perception; structured equation modelling; university support

Introduction

Agriculture is most important for the economic development of the country, as approximately 45 % of India's workforce is employed in the agriculture sector. This contributes over 15 % to the nation's GDP. Agriculture remains as most important sector in many economies, providing food security, employment and economic growth (1). But the traditional agricultural practices face challenges like climate change, lack of resources, lack of market information and price fluctuations (2). Agribusiness startup plays a dominant role in promoting agriculture and improving the agriculture sector by integrating technology into farming activities to improve productivity and ensure efficient supply chain management and improve market opportunities for agricultural products. It provides a broad range of activities such as input supply, production, processing and distribution and retailing of agricultural products (1). Those startups cover a wide range of aspects, including agro-processing, agricultural input marketing, precision farming, supply chain management, agricultural services and various agricultural advancements in blockchain technology and automation, all aimed at enhancing efficiency and productivity (3,4). India's currently third third-largest startup ecosystem in the world, followed by the USA and China. As of January 2025, more

than 159000 startups had been recognised by the Department for Promotion of Industry and Internal Trade (DPIIT), among these 8-10 % of startups under the agriculture or agritech domain. According to Startup India, in the current economic landscape, startups have become significant contributors to economic growth and innovation. Based on startup regulations, an entity is considered a startup up to ten years from its incorporation or registration, with annual turnover not exceeding ₹100 crore and registered as a private limited company, partnership firm or limited liability partnership in India (5). Over 90 % of Indian startups fail within the first five years, which is significantly higher than failure rates observed in developed startup ecosystems such as The United States and China. In India, 90 % of startups failed within five years due to a lack of innovation, skills gap, funding challenges, lack of mentorship, poor business ethics, work leadership and inexperience (6). Agribusiness startups have emerged as a transformative force, integrating innovation, technology and sustainable business models to address these challenges (7). For agricultural students, agribusiness startups offer career opportunities that provide technical expertise with business knowledge, encouraging entrepreneurial ventures. Despite this, awareness among students varies due to differences in curriculum, exposure to industry trends and access to startup incubation support. Many students remain unfamiliar with startup

dynamics, funding sources and market strategies, which limits their ability to capitalise on agribusiness opportunities (8). Additionally, startups should also focus on the natural quality of agri products. A startup should be eco-friendly and the product should not contain any component which directly or indirectly can harm the environment, humans and soil, etc. Agri-based startup combines technology with sustainability to address the challenges of modern agriculture. With a focus on minimizing environmental impact to enhance the productivity and profitability of farmers, this helps to shape the future of Indian agriculture (9). Students are moderately aware of the available opportunities and major constraints in agribusiness. Perception of students towards agribusiness plays a major role in influencing their willingness to start a new venture in the agribusiness sector. Positive perception has been linked to the agribusiness opportunities, university support, skills and a supportive environment. Students' perceptions are influenced by factors such as individual behaviour, institutional support and external environment. Constraints faced by entrepreneurs in developing economies are analysed; these constraints hinder the entrepreneurial intention among students. Major constraints are unfavourable business; political and economic environments are considered major issues. Lack of infrastructure facilities, inadequate research and development and lack of connectivity (10). Therefore, agriculture remains a critical pillar for India's economic and social development, by providing employment opportunities to a large share of the population and contributing to GDP. But agribusiness sector continues to face numerous structural and environmental challenges. Agribusiness startups have emerged as a solution to modernize agriculture through technology integration, supply chain optimization and value addition. Still, moderate awareness, skill gaps and systemic constraints interrupt students from engaging in the agribusiness landscape. Understanding the students' perceptions and addressing their barriers is essential for promoting entrepreneurship and innovation and sustainable growth in the agriculture sector.

Materials and Methods

Data collection and sample selection

This study uses a cross-sectional research methodology. The study population of this study was the final year undergraduate students from the agricultural university. These university students from the disciplines of various undergraduate programmes such as agriculture, horticulture, agribusiness management, biotechnology, agricultural engineering, food processing engineering, energy and environment engineering. A sample size between 30 and 500 is considered appropriate to undertake scientific research. A minimum threshold of 100 samples is proposed for Structural Equation Modelling via Partial Least Squares (PLS-SEM). Therefore, to avoid any possible complications that may arise due to the small sample size, this study uses the google forms platform to collect data from 211 students (11).

Research instrument

The questionnaire was adopted from several validated studies. To assess the students' awareness level of agricultural students regarding agribusiness startups, relevant items were selected and suitably modified to align with the objectives of this study (12). To measure students' perception towards agribusiness startups, constructs such as agribusiness prospects and skills,

university support and intention to start agribusiness and supportive environment were adopted from previous studies (13-15). Items for constraints that hinder the startup intention from (9). The data for each construct of each research model were collected using a five-point Likert scale ranging from 1 to 5, with 1 indicating that strongly disagree and 5 indicating that strongly agree.

Data analysis method

Percentage analysis is used to analyse the socio-economic characteristics of the respondents

$$\text{Percentage analysis} = \frac{\text{No. of. respondendts}}{\text{Total sample size}} \times 100 \qquad \text{(Eqn. 1)}$$

Descriptive statistics to assess the level of awareness among students towards agribusiness startups, particularly the mean and standard deviation. The means show the average level of awareness of students based on their responses to various statements related to agribusiness startups. The standard deviation shows the variability of students' awareness across students; a higher standard deviation shows wider variation in students' awareness; lower level of standard deviation shows a similar level of awareness.

Structural Equation Modelling (SEM)

To measure the level, Partial Least Squares Structural Equation Modelling (PLS-SEM) with the Smart-PLS software 4.0 was used to evaluate the respondents' data. PLS-SEM is a multivariate exploration instrument to assess path models that have the latent constructs with composites. PLS-SEM was used to examine the relationships between agribusiness prospects, university support, supportive environment, skills and intention to start an agribusiness startup to know the students' perception towards agribusiness (11). By adopting the theory of planned behaviour, from that attitude (agribusiness prospects), perceived behaviour control (university support, skills), subjective norms (supportive environment) and behavioural intention (Intention to start an agribusiness startup).

Garret ranking

It is used to rank the constraints for entrepreneurs in pursuing an agribusiness startup. Calculate percent position: The percent position for each rank is calculated using the formula:

$$\text{Percent position} = 100 \times \frac{R_{ij} - 0.5}{N_j} \qquad \text{(Eqn. 2)}$$

Where,

R_{ij} = Rank given for the ith factor by the jth respondent

N_j = Number of factors ranked by the jth respondent

To determine Garrett scores: The calculated percent positions are matched with corresponding Garrett scores from a standard conversion table. Compute total and average scores: The Garrett scores for each factor are summed across all respondents to obtain a total score. The average score is then calculated by dividing the total score by the number of respondents. Rank factors: factors are ranked based on their average Garrett scores; the factor with the highest average score is considered the most significant (16).

Relative Importance Index (RII)

The RII is a statistical tool widely used to rank different factors based on their level of importance. In research, responses are prioritized based on their ratings. RII, is used to estimate the

relative significance of students' expectations from the university to become an entrepreneur. RII helps to quantify and prioritize their requirements, expectations and support from the university that improve the intention among the students towards agribusiness startups. Formula for RII is as follows (17).

Formula for RII

$$\text{Relative importance index} = \frac{\sum W \times X}{A \times N} \qquad \text{(Eqn. 3)}$$

Where,

W = Weight assigned to each response (e.g., 1 for "strongly disagree" up to 5 for "strongly agree")

X = Frequency of each response

A = Highest possible weight (e.g., 5 if using a 5-point Likert scale)

N = Total number of respondents

Results and Discussion

Demographic characteristics of students

Gender distribution

From the results of Table 1, it is obtained that 66.35 % of the respondents are female, whereas 33.65 % are male. This suggests a greater representation of female students in agricultural education institutions, indicating increasing female participation in agricultural studies and potentially agribusiness. The involvement of women in agricultural education is steadily rising, suggesting their growing interest and engagement in entrepreneurial activities in agriculture. According to Startup India, as of January 2025, there are around 159000 recognized of which around 46 % of startups have atleast one women director.

Locality

Most students belong to rural areas (49 %), followed by urban (27 %) and semi-urban (24 %) areas. This aligns with the general pattern where agriculture-related educational institutions are predominantly located in rural or semi-rural settings. Students from rural areas may have first-hand exposure to farming practices, which could enhance their inclination toward agribusiness ventures. As per statistical analysis, the results are interpreted.

Nearly income level: A significant majority (60.2 %) of students belong to families with an annual income of less than ₹100000, highlighting the economically modest background of most students. This may influence their entrepreneurial drive, as agribusiness could be seen as a means of upward mobility. Students from lower-income backgrounds often view entrepreneurship as a viable strategy for economic independence. As per statistical analysis, the results are interpreted.

Table 1. Demographic characteristics of students

Particulars		Frequency	Percentage (%)
Gender	Male	71	33.65
	Female	140	66.35
Locality	Urban	57	27
	Semi urban	50	24
	Rural	104	49
Income level	<100000	127	60.2
	100000-300000	47	22.3
	300000-600000	22	10.4
	>600000	15	7.1
Size of land Holding	<1 acre	100	47.4
	1-2 acre	46	21.8
	2-5 acre	33	15.6
	>5 acre	32	15.2
Concerned Department	Agriculture	61	28.9
	Horticulture	63	29.9
	Agribusiness Management	48	22.7
	Biotechnology	11	5.2
	Agriculture Engineering	1	0.5
	Food Processing Engineering	11	5.2
	Energy and Environment Engineering	16	7.6
Interest in Agri Business	Yes	162	76.8
	No	49	23.2

Size of landholding

47.4 % of students reported owning less than one acre of land, while only 15.2 % owned more than five acres. This reflects a pattern of marginal and small landholding among students' families. Such students may view agribusiness startups as opportunities to augment or diversify their agricultural income. As per statistical analysis, the results are interpreted.

Interest in agribusiness

A notable 76.8 % of respondents expressed interest in pursuing agribusiness, reflects a positive attitude toward entrepreneurship in agriculture. This indicates a fertile ground for policy and institutional support for promoting startup and innovation among youth in agriculture. Students' expectations have shown that interest in agribusiness is positively associated with curriculum exposure, training and internship programs. From a previous study 73 % of students have shown interest in agribusiness startups (18).

Student awareness about agribusiness startups

It is evident from the Table 2 that the study assessed the student's awareness of agribusiness startups using ten statements on a five-point Likert scale. The overall average score was 3.65 (SD = 0.97), indicating a moderate level of awareness. The highest awareness was for "agribusiness can be profitable for youths with the right skills" (Mean = 4.01, SD = 0.897), followed by "agribusiness startup contribution most important to the agricultural sector" (Mean = 3.86, SD = 0.870) and "business incubators play a major role in

Table 2. Student awareness about agribusiness startups

Particulars	Mean	Standard deviation
Agribusiness can be profitable for youths with the right skills	4.01	0.897
Agribusiness startup contribution is most important to the agricultural sector	3.86	0.870
Business Incubators play a major role in promoting startups	3.81	0.996
Agribusiness fairs and expos provide useful opportunities for aspiring entrepreneurs	3.79	0.984
Agribusiness is seasonal, meaning there could be periods of waiting without income	3.57	0.941
Agriculture is too labour-intensive for me	3.57	0.914
E-commerce platforms supporting agribusiness products	3.56	1.009
Becoming an entrepreneur in the agricultural sector is highly risky	3.49	0.973
Familiar with the concept of agribusiness	3.48	0.992
Aware of agribusiness funding programs provided by the government	3.27	1.140
Average	3.64	0.97

promoting the startups" (Mean = 3.81, SD = 0.996). The lowest awareness was for "aware about agribusiness funding programs provided by the government" (Mean = 3.27, SD = 1.140). The result shows that while students have a good interest in agribusiness startups, hence there is a clear need for better support and guidance. The low awareness about government funding and moderate understanding of key concepts may hinder many from starting their ventures. From another study, students valued agribusiness potential form of youth employment and job creation, but students need support from government with incubators and mentorship (19). In both study students are very less aware about exposure and support mechanisms from government.

Students' perception towards agribusiness

The study developed a conceptual framework to examine the relationships between agribusiness prospects, university support, supportive environment, skills and intention to start an agribusiness startup. Fig. 1 shows the conceptual framework for students' perception towards agribusiness.

Structured equation modelling is an important data analysis method for social sciences and business because it can model the complex relationships between the variables being measured. SEM is a research technique that enables the testing of theoretical models based on research hypotheses. Structural models are run to fulfill significant requirements in Smart-PLS to ensure that latent variable relationships are reliable and meaningful. The path coefficients signify the magnitude and direction of the association among the latent variables. In SmartPLS, if the p-value < 0.05, the path coefficients represent the strength and direction of the relationship between the two variables. The higher the coefficient, the stronger the impact of the independent variable on the dependent variable. The variables that are used for analysis are shown in Table 3.

It is evident from Fig. 2 and Table 4 that agribusiness prospects (PA) have a positive impact on intention to start an agribusiness startup (IA) (0.464). Opportunities available for students had a strong influence on the students to start a new venture. Students who believe that agribusiness offers good opportunities are more likely to start an agribusiness venture, as this perception strongly motivates them. University Support (US) has a strong influence on providing the Skills (KS) (0.770). Technical knowledge (financial management) and valuable experience, like agri internships, training and workshops had a strong effect on improving the skills of students. University Support (US) has a positive impact on intention to start an agribusiness startup (IA) (0.128). University support, like entrepreneurship culture, has moderate effect on starting agribusiness startups. Skills have a strong influence on students' intention to start agribusiness startups (IA) (0.214). Supportive environment (SE) has a positive effect on intention to start agribusiness startups (IA) (0.055). In supportive environment, family, government and external support had influence, but didn't have a huge impact on the intention to start an agribusiness startup.

As shown in Table 5, the construct demonstrates convergent validity, with Cronbach's alpha values greater than 0.7 and AVE values greater than 0.5. Meanwhile, the correlation of all constructs to the construct itself is greater than the correlation to other constructs, so it has discriminant validity (20).

In the results of Table 6, SMART-PLS, discriminant validity refers to the degree to which a construct within a research model is distinct from other constructs. It measures how well a particular construct can be distinguished from other constructs in the same model, which is critical for ensuring that the construct does not overlap with other constructs in the model. In the Heterotrait Monotrait ratio (HTMT), where the HTMT < 0.90, shows discriminant validity, indicating that all constructs are distinct from each other (21). The analysis shows that the students intention to start an agribusiness venture is primarily driven by their perception of agribusiness prospects like available opportunities and skills they acquired through university programs. Previous research shows that students have positive perception towards agribusiness as profitable and offers opportunities for entrepreneurship and self-employment (22). The university didn't have direct impact on entrepreneurial intention of students, but it has strong effect on improving skills. As a result, role of family, financial institutions and government
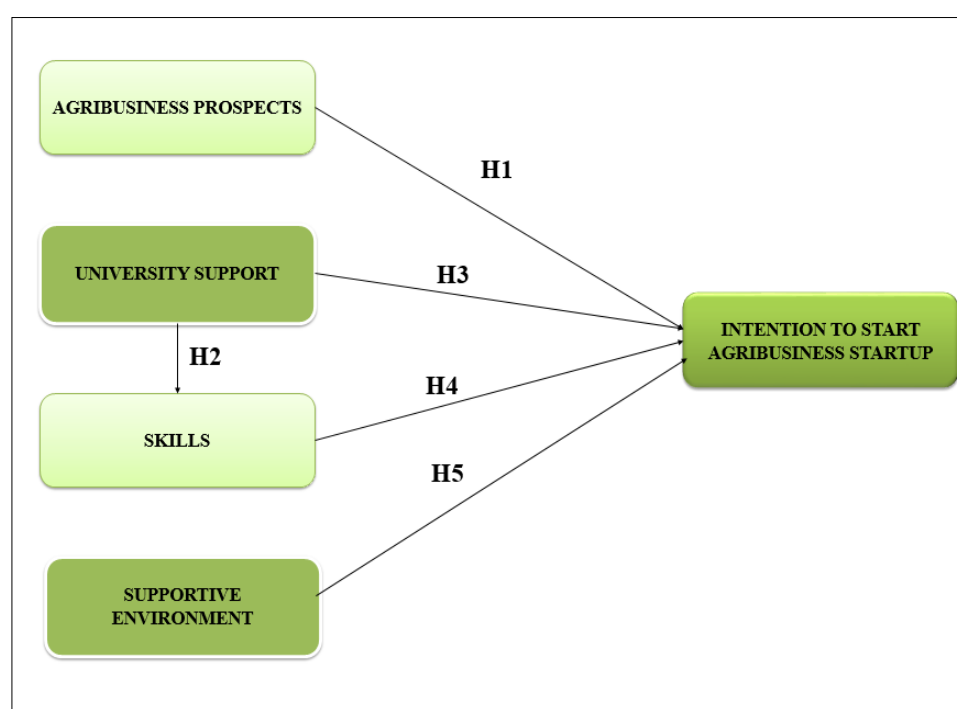

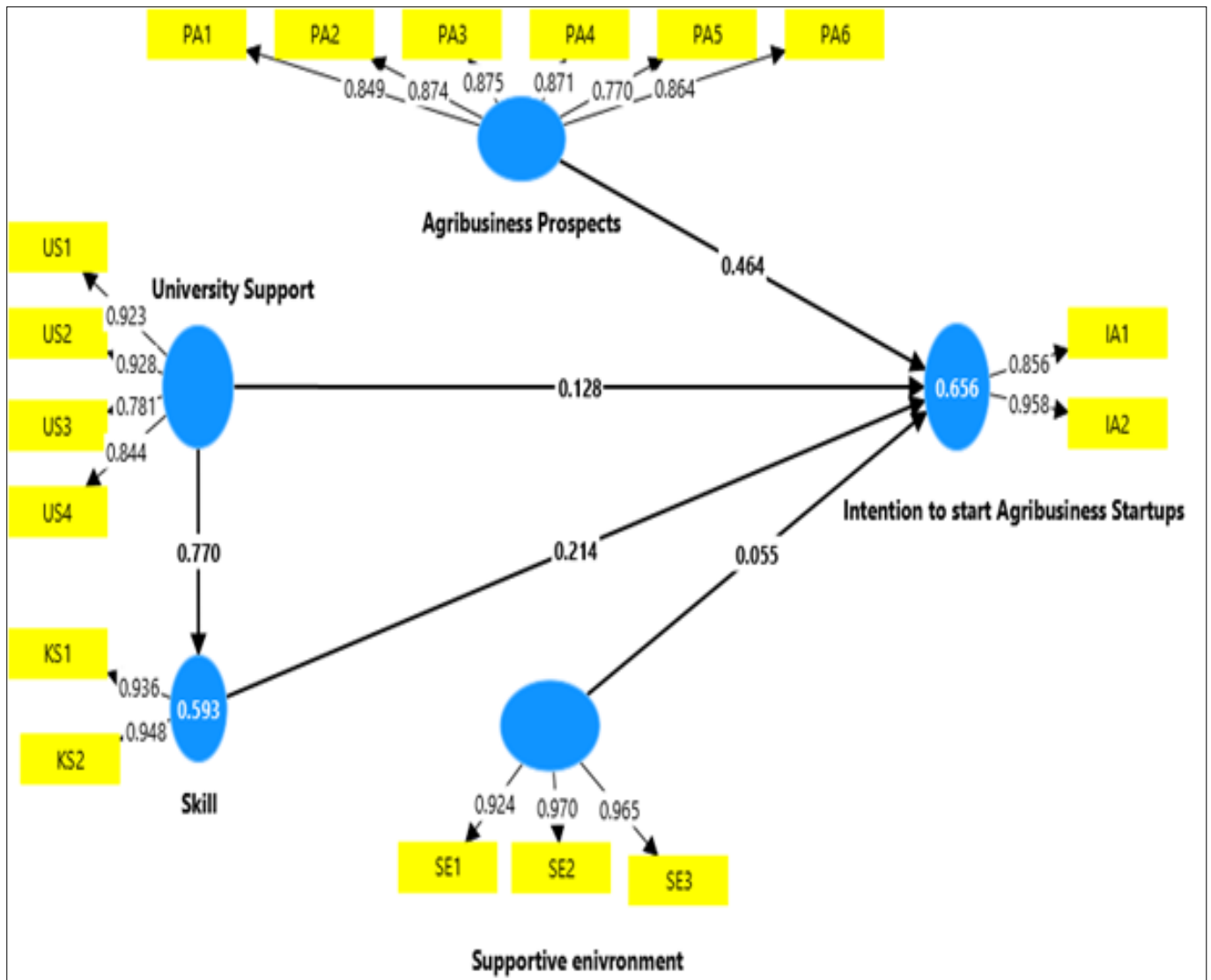**Fig. 1.** Conceptual framework for students perception towards agribusiness.

Fig. 2. PLS-SEM analysis for students' perception towards agribusiness.

Table 3. Students' perception towards agribusiness startup

Component	Items	Particulars
Agribusiness prospects (25)	PA1	An agribusiness startup is a way to innovate in the agricultural industry.
	PA2	Agricultural-related enterprises are very profitable.
	PA3	Agribusiness is the right choice for agricultural students.
	PA4	Agribusiness has high potential for self-employment in India.
	PA5	Agribusiness startup bridges the gap between farmers and markets.
	PA6	Agribusiness factors are important for economic growth.
University support (26)	US1	University should facilitate agribusiness startup internships.
	US2	University motivates students to start a business.
	US3	University promotes an entrepreneurship culture.
	US4	University provides information about available opportunities.
Supportive environment (27)	SE1	Financial institutions are providing the required adequate finance to run the business.
	SE2	Government policy favours the establishment of agricultural enterprise creation.
	SE3	My family supports me to be an entrepreneur.
Skills (25)	KS1	Agricultural students have the requisite technical knowledge to be successful agripreneurs.
	KS2	Agricultural students have valuable experience in agribusiness.
Intention to start Agribusiness (26)	IA1	I have a strong desire to start an agribusiness.
	IA2	I want to be a successful entrepreneur.

Table 4. Path coeffient of SEM analysis

Path	Coefficient	Interpretation
Agribusiness prospects → Intention to start agribusiness startups	0.464	Significant - Agribusiness prospects strongly influence students' entrepreneurial intention. If students see potential in agribusiness, they are more likely to pursue it.
University support → Skills	0.770	Significant - University support plays a critical role in developing students' skills needed for agribusiness.
Skills → Intention to start agribusiness startups	0.214	Significant - Skills moderately influence entrepreneurial intention, meaning acquiring skills increases the likelihood of starting a business.
University support → Intention to Start agribusiness startup	0.128	Significant - University support alone does not directly influence students' startup intentions. It works indirectly through skill development.
Supportive environment → Intention to start agribusiness startups	0.055	Significant - A supportive environment alone does not have a strong impact on students' decision to start a business.

Table 5. Discriminant validity, convergent validity and composite reliability test

Convergent validity and composite reliability test			
Constructs	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)
Agribusiness prospects	0.925	0.940	0.725
University Support	0.892	0.926	0.759
Supportive environment	0.950	0.968	0.909
Skills	0.874	0.941	0.888
Intention to start Agribusiness Startups	0.803	0.904	0.825

Table 6. Discriminant validity - Heterotrait and Monotrait (HTMT) ratio

Discriminant validity - Heterotrait and Monotrait matrix (HTMT) ratio					
	Agribusiness prospects	Intention to Start an Agribusiness Startup	Skills	Supportive Environment	University Support
Agribusiness prospects					
Intention to Start Agribusiness Startup	0.802				
Skills	0.833	0.790			
Supportive Environment	0.734	0.789	0.786		
University Support	0.768	0.831	0.866	0.881	

had huge impact on entrepreneurial intention of students but compared to agribusiness prospects, external environment had less impact than agribusiness prospects (22,23).

Constraints for entrepreneurs

The constraints faced by entrepreneurs pursuing an agribusiness startup is studied using eleven statements on a five-point Likert scale and is shown in Table 7. The top constraint was for "unfair competition from bigger players in the market" (Garrett Mean Score = 58.72), followed by "lack of availability of equity capital" (Garrett Mean Score = 58.16) and "lack of mentorship is a major challenging in agribusiness" (Garrett Mean Score = 57.04). The low-ranked constraints were for "non-agriculture background" (Garrett Mean Score = 54.90) and "lack of family support and encouragement"(Garrett Mean Score = 53.22). The results of Garrett ranking show that economic and structural challenges, such as market competition, funding gaps, or unavailability of equity and lack of guidance, are seen as the major constraints for entrepreneurs. Building structured mentorship programs in universities, regular exposure to business incubators and raising students' awareness about facilities available for entrepreneurs in business incubators, to improve the students' intention to become successful entrepreneurs. The findings of the study are consistent with a previous study, which identified similar barriers among agricultural students in Gujarat. In both studies economic and structural constraints such as funding gaps and market competition and lack of guidance or mentorship were ranked as the most critical

challenges (24). These similarities highlight the prevalence of these limitations among state agricultural universities, underscoring the need for structural changes.

Students' expectations from the university

RII calculations from Table 8 indicates that the students' expectations from universities to encourage entrepreneurship, particularly in agribusiness. The RII rankings indicate the priority areas where universities should focus their efforts to enhance entrepreneurial intentions and capabilities among students. The study assessed to know the students' expectations from the university to encourage the entrepreneurial intention among students, measured by using eight statements on a five-point Likert scale. The major expectation was for "the university should facilitate the mentorship activities" (RII = 0.85), followed by "guest lecture and interaction session with successful agripreneurs" (RII 0.82) and "entrepreneurship education to improve the entrepreneurial intention among students" (RII 0.81). The least expected outcome from students was for "entrepreneurship related workshops should be conducted regularly" (RII 0.79) and "university support to enable a working environment with the private sector to know about their activities" (RII = 0.77). The results show that students are highly interested in pursuing an agribusiness startup but require substantial support from the university in the form of mentorship, exposure to real-world entrepreneurs and structured education and training. By offering practical workshops on available opportunities

Table 7. Constraints for the entrepreneurs

Particulars	Garrett mean score	Mean rank
Unfair competition from the bigger players in the market	58.72	I
Lack of availability of equity capital	58.16	II
Lack of mentorship is a major challenge in agribusiness	57.04	III
Lack of networking opportunities reduces the agribusiness startup effort	56.87	IV
High collateral security requirements for debt activities	56.53	V
Frequent changes in government rules and regulations	56.21	VI
Limited knowledge on how to set up a startup	55.48	IX
High operational costs at the initial stage hinder the agribusiness startup.	55.78	VII
Non-agriculture background	54.90	X
Lack of family support and encouragement	53.22	XI

Table 8. Students' expectations from university

Particulars	Weighted average sum	Relative Importance Index	Rank
University should facilitate mentorship activities	893	0.85	I
Guest lecture and interaction sessions with successful agripreneurs	873	0.82	II
Entrepreneurship education to improve the entrepreneurial intention among students	865	0.81	III
University support for access to financial activities	857	0.81	IV
Educational training on entrepreneurship education	850	0.80	V
Access to the business Incubator should be increased	849	0.80	VI
Entrepreneurship-related workshops must be conducted regularly	843	0.79	VII
University support to enable a working environment with the private sector to know about their activities	812	0.77	VIII

in agribusiness, a mentorship program and helping students to identify relevant startup grants from the government. As per statistical analysis are interpreted.

Conclusion

Majority of students (77 %) showed interest in starting agribusiness startups, but faced challenges such as financial support, lack of mentorship and regulatory barriers that limited their entrepreneurial intentions. Students from rural areas and semi-urban areas showed more interest in agribusiness startups, as did those with land holdings exceeding 5 acres. Students with family income levels less than ₹100000 showed the highest interest in agribusiness startups. Students' entrepreneurial interest was determined by agribusiness prospects, institutional support (University Support) and external environment (supportive environment), with agribusiness prospects having the strongest influence. Similar to a recent study, the present study also uses attitude, personality traits, perceived behaviour control and subjective norms are used to assess the agripreneurship intention of students (25). Major constraints included unfair competition from larger market players, lack of equity capital, lack of mentorship and lack of networking opportunities. Key expectations from the university include mentorship activities, interaction with successful agripreneurs, entrepreneurship education, support for financial activities and increased access to business incubators.

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Authors' contributions

SB and MM were involved in conceptualization, methodology, data collection, investigation, formal analysis and writing of the original draft. KU contributed to resource provision, drafting and supervision. SRP participated in providing resources, investigation and supervision. RPS contributed to resources, visualization and supervision. All authors read and approved the final manuscript.

Compliance with ethical standards

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Additional information