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Agri-business innovation in India: SWOC analysis of institutional incubators

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Abstract
Innovation is the backbone of agro-entrepreneurship, as it creates new opportunities and offers higher profits for entrepreneurs. For the development of entrepreneurship in the agriculture sector, there is a need to improve agribusiness at a faster rate than on-farm production. The Agri-Business Incubator (ABI) serves as a hub where entrepreneurs are supported with agricultural technology, business consulting, networking with management experts, access to venture capital, infrastructure, and other essential facilities to help them establish their own agri-business ventures. Over 500 agri-tech projects have been launched in India (Start-up India, 2020). This study was conducted in two states—Kerala and Tamil Nadu. The Agri-Business Incubators in these states, which are affiliated with the State Agricultural Universities (SAUs) and Research Institutes under the Indian Council of Agricultural Research (ICAR), were selected for analysis. Two Agribusiness Incubators each from Kerala and Tamil Nadu were purposively chosen for the study. The paper aims to analyze the Strengths, Weaknesses, Opportunities, and Challenges (SWOC) of these Agri-Business Incubators. Based on a review of existing literature, expert opinions, and focused group discussions with ABI officials, the relevant items were generated, and results were obtained accordingly.

Keywords: SWOC analysis, agribusiness incubators, innovation, capacity building

Introduction
Innovation is the backbone of agro-entrepreneurship, as it brings new opportunities and higher profits for entrepreneurs. To foster the development of entrepreneurship in the agriculture sector, there is a need to accelerate the growth of agribusiness more rapidly than on-farm production. In response to the need for a system that is both dynamic and flexible and one that provides necessary support is Agri-Business Incubators (ABIs) which offers opportunities to go beyond traditional farming and engage in more impactful mechanisms of economic contribution.

An Agri-Business Incubator (ABI) is a location where entrepreneurs are supported with agricultural technologies, business consulting, networking with management experts, venture capital access, infrastructure, and other essential services to help them establish their own agri-business ventures. Additionally, ABIs open up new possibilities for product localization and foster entrepreneurship and leadership, which are vital for the growth of emerging economies. Over 500 agri-tech projects have been launched in India (Start-up India, 2020).

The concept of incubation has gained global popularity due to its potential to create an environment conducive to entrepreneurial development (Mahmood *et al*., 2015) [9]. Agri-business incubators are often regarded as the "magic bullet" that can prevent the failure of agricultural ventures and facilitate their successful integration into the economy. For these reasons, the concept of ABIs remains highly relevant and significant.

This paper aims to analyze the Strengths, Weaknesses, Opportunities, and Challenges (SWOC) of Agri-Business Incubators (ABIs).

Materials and Methods
The study was conducted in two states - Kerala and Tamil Nadu. The Agri-Business Incubators in these states, affiliated with the State Agricultural Universities (SAUs) and Research Institutes under the Indian Council of Agricultural Research (ICAR), were selected for the study. Two Agri-Business Incubators from each state were purposively chosen.

From Kerala, the Agri-Business Incubator (ABI) of Kerala Agricultural University (KAU) at Thrissur and the Technology Incubation Centre (TIC) of the Central Tuber Crops Research Institute (CTCRI) at Thiruvananthapuram under ICAR were selected, out of the six ABIs in the state. From Tamil Nadu, out of the nine ABIs, the Madurai Agri-Business Incubation Forum (MABIF) of NABARD at Madurai under Tamil Nadu Agricultural University (TNAU), and the Agri-Business Incubator of the ICAR-Sugarcane Breeding Institute at Coimbatore were selected. Thus, a total of four ABIs one each under SAU and ICAR from each state were included in the study.

The respondents were ABI officials, with data collected from five officials at each incubator. Therefore, a total of 20 officials from the two states constituted the sample for the study.

Using an open-ended questionnaire, the SWOC (Strengths, Weaknesses, Opportunities, and Challenges) of each incubator was assessed. As each ABI has unique strengths and weaknesses, the officials were personally interviewed to gather in-depth insights. Similarly, each ABI faces distinct opportunities and challenges as it strives to enhance its incubation services for agripreneurs. Appropriate statistical tools were used for data interpretation and result generation.

Results and Discussion

SWOC ANALYSIS OF THE ABIs

As revealed by the ranking of the strengths, weaknesses, opportunities and challenges/constraints based on the response score given by the officials working in the ABIs are furnished in the tables given below.

1. SWOC analysis of KAU- ABI

Table 1: Strengths of the KAU-ABI

Sl. No.	KAU-ABI	Frequency	Percentage
1.	Incubation programs such as RAISE and PACE	4	80
2.	Product development and refinement	5	100
3.	Mentoring support in business and technology plans	3	60
4.	Capacity building programs	5	100
5.	Entrepreneurship cum skill development	4	80

It is evident from the table 1 that the most important strengths of the KAU-ABI were product development and refinement (100%) and capacity building programs (100%). Similarly, Incubation programs such as RAISE and PACE (80%) and Entrepreneurship cum skill development (80%) were rated as the next major strengths of the KAU-ABI. The next major strength was Mentoring support in business and technology plans which had 60.00 percent of response.

Table 2: Weaknesses of the KAU-ABI

Sl. No.	KAU-ABI	Frequency	Percentage
1.	Facility for all areas of agriculture not available at single incubator	3	60
2.	Low manpower	4	80
3.	Less publicity among public about incubation facilities	5	100
4.	Need more infrastructure	2	40
5.	Shortage of fund	5	100

It is inferred from the table 2 that the most important weakness of the KAU- ABIs isless publicity among public about incubation facilities (100%) and Shortage of fund (100%). Low manpower had 80.00 percent of the response and rated as the next major weakness. Facility for all areas of agriculture not available at single incubator (60%) and need more infrastructure (40%) were other weaknesses of the KAU- ABI.

Table 3: Opportunities of the ABIs

Sl. No.	KAU-ABI	Frequency	Percentage
1.	Food analysis, food microbiology and quality control lab inside the incubator	5	100
2.	Product standardization	3	60
3.	Training & hands on experience on processing machine	5	100
4.	Marketing assistance	2	40
5.	Financial support	1	20

It is concluded from the table 3 that the most important opportunities available at KAU-ABI is both food analysis, food microbiology and quality control lab inside the incubator (100%) and training and hands on experience on processing machine (100%) which scored equal percent. It is then followed by product standardization (60%) and Marketing assistance (40%) that were ranked as the next major opportunities available at the KAU-ABI. Finally, financial support (20%) was ranked as another opportunity available at the KAU-ABI.

Table 4: Challenges / constraints of the ABIs

Sl. No.	KAU-ABI	Frequency	Percentage
1.	Other than government grant not much financial support through other investors.	3	60
2.	Shortage of separate fund for R&D	4	80
3.	Grant providing schemes takes much time for grant giving to start-ups selected	2	40
4.	Need new technology machineries	2	40
5.	International networking needs improvement	1	20

It could be seen from Table 4 that, the major challenge/ constraint faced by KAU-ABI is shortage of separate fund (80%). The next major challenge/ constraint faced was other than government grant not much financial support through other investors (80%) followed by grant providing schemes takes much time for grant giving to start-ups selected (40%) and need new technology machineries (40%) were another major challenge/ constraint faced by KAU-ABI. International networking needs improvement got 20.00 percent and ranked as the least challenge/ constraint faced by KAU-ABI.

2. SWOC analysis of TIC-CTCRI

Table 5: Strengths of the TIC-CTCRI

Sl. No.	TIC-CTCRI	Frequency	Percentage
1.	Tuber crops are more focused for increasing its value	4	80
2.	Can support business development, including training on financial management, marketing, and business planning.	2	40
3.	Can provide start-ups with access to shared resources, such as land, equipment, and facilities.	3	60
4.	Have a network of experienced mentors, advisors, and industry experts who can provide guidance on farming practices, market trends, and business development	3	60
5.	Convergence - Collaborating with three organizations for establishing Satellite Incubation Centres (SIC)	2	40

A glimpse at the Table 5 reveals that, tuber crops are more focused for increasing its value (80%) was considered as the most important strength of the TIC-CTCRI. It is followed by the next major strength that is it can provide start-ups with access to shared resources, such as land, equipment, and facilities (60%) and have a network of experienced mentors, advisors, and industry experts who can provide guidance on farming practices, market trends, and business development (60%). Similarly, it can support business development, including training on financial management, marketing, and business planning (40%) and convergence - collaborating with three organizations for establishing Satellite Incubation Centers (SIC) (40%) were rated as another major strength of the TIC-CTCRI.

Table 6: Weaknesses of the TIC-CTCRI

Sl. No.	TIC-CTCRI	Frequency	Percentage
1.	Narrow focus - Only tuber crops are promoted	2	40
2.	Enrolment of incubatees is less	5	100
3.	Limited assistance by technical experts	3	60
4.	ABI may have strict admission criteria, which can make it challenging for some aspiring entrepreneurs to gain entry	2	40
5.	ABI typically provide shared resources, there may be competition among start-ups for access to land, equipment, or other facilities	3	60

On perusal of Table 6, high weakness of TIC- CTCRI is enrolment of incubatees is less (100%). Followed by the next weaknesses that is ABI typically provide shared resources, there may be competition among start-ups for access to land, equipment, or other facilities (60%) and limited assistance by technical experts (60%). Then narrow focus - only tuber crops are promoted and ABI may have strict admission criteria, which can make it challenging for some aspiring entrepreneurs to gain entry also got equal percent 40.00 percent were the least major weaknesses mentioned by the TIC-CTCRI.

Table 7: Opportunities of the TIC-CTCRI

Sl. No.	TIC-CTCRI	Frequency	Percentage
1.	Opportunities for convergence with public and private sector agencies are high	2	40
2.	To capture international market - Tropical tuber crops are primary or secondary staples in Sub-Saharan Africa, Industrial crops in South East Asia	3	60
3.	Helps in business development for youths	3	60
4.	Technology commercialisation is high	2	40
5.	Scope for tuber crops exploitation and product diversification	5	100

It could be seen from the table 7, scope for tuber crops exploitation and product diversification had high level (100%) opportunity available in TIC-CTCRI. It is followed by helps in business development for youths (60%) and to capture international market - tropical tuber crops are primary or secondary staples in sub-Saharan Africa, industrial crops in South East Asia (60%) both had same percent and ranked as the next major weaknesses of the TIC-CTCRI. Opportunities for convergence with public and private sector agencies are high (40%) and technology commercialisation is high (40%) were mentioned as the least major opportunity available in TIC-CTCRI.

Table 8: Challenges / constraints of the TIC-CTCRI

Sl. No.	TIC-CTCRI	Frequency	Percentage
1.	Lack of Infrastructure	5	100
2.	Conversion of idea into product is difficult	1	20
3.	Tropical tubers are used primarily for consumption and limited no of products available	3	60
4.	Income generation is decreasing	3	60
5.	Regulatory hurdles and market volatility	2	40

It could be seen from the table 8, the most important challenge/ constraint faced by the TIC-CTCRI was lack of infrastructure (100%). Tropical tubers are used primarily for consumption and limited no of products available and income generation is decreasing, both got 60.00 percent and ranked as the next major challenge/ constraint faced by the TIC-CTCRI. It is followed by regulatory hurdles and market volatility (40%) and conversion of idea into product is difficult (20%) were the least major challenge/ constraint faced by the TIC-CTCRI.

3. SWOC analysis of NABARD-MABIF

Table 9: Strengths of the NABARD-MABIF

Sl. No.	NABARD-MABIF	Frequency	Percentage
1.	Networking and mentoring	4	80
2.	Various schemes including IPFC, CBBO, CCF	5	100
3.	Business development support	5	100
4.	High level of convergence	2	40
5.	More capacity building programme and trainings	4	80

The results of the Table 9, reveals that the most important strengths of the NABARD-MABIF were various schemes including IPFC, CBBO, CCF (100%) and business development support (100%) provided to the incubatees. Followed by networking, mentoring and more capacity building programme and trainings that got 80.00 percent and were the next major strengths of NABARD-MABIF. Finally, high level of convergence got 20 percent and is regarded as another major strength of NABARD-MABIF.

Table 10: Weaknesses of the NABARD-MABIF

Sl. No.	NABARD-MABIF	Frequency	Percentage
1.	Huge cost of modern technologies	5	100
2.	Follow-up is inadequate	4	80
3.	Complex export procedure	2	40
4.	Limited access to modern technologies	1	20
5.	Lack of commitment among workers	1	20

From the table 10, the most important weaknesses of the NABARD-MABIF was it involves huge cost of modern technologies (100%) and follow-up is inadequate (80%). It is followed by complex export procedure that had 40.00 percent. Then both limited access to modern technologies and lack of commitment among workers had 20.00 percent and was the least weaknesses of NABARD-MABIF.

Table 11: Opportunities of the NABARD-MABIF

Sl. No.	NABARD-MABIF	Frequency	Percentage
1.	In-house production centre	5	100
2.	In-house food-testing centre	5	100
3.	Provides visibility for products	2	40
4.	Increasing market span and export opportunities	4	80
5.	More employment generations	5	100

From the table 11, it can be found that almost equal percentage (100%) and the most important of opportunities available in the NABARD-MABIF were in-house production centre, in-house food-testing centre and more employment generations. Followed by increasing market span and export opportunities got 80.00 percent was another major opportunity available in the NABARD-MABIF. Finally, another major opportunity available in the NABARD-MABIF was that it provides visibility for products (40%).

Table 12: Challenges / constraints of the NABARD-MABIF

Sl. No.	NABARD-MABIF	Frequency	Percentage
1.	Unfavourable Government Policies	3	60
2.	Breakdown cost is more	5	100
3.	Lack of technological back up	2	40
4.	To reach out the agripreneurs from farming society	2	40
5.	Facility maintenance is a problem	5	100

On perusal of Table 12, the major challenges / constraints faced by the NABARD-MABIF were high break down cost and difficulty in facility maintenance with equal percentage (100%). It is followed by unfavourable Government Policies (60%) and both lack of technological back up and to reach out the agripreneurs from farming society had 40.00 percent and were the least challenges / constraints faced by the NABARD-MABIF.

4. SWOC analysis of SBI- ABI

Table 13: Strengths of the SBI- ABI

Sl. No.	SBI-KAU	Frequency	Percentage
1.	Sugarcane based novel and commercialized products	5	100
2.	Mentoring and capacity building programmes	2	40
3.	Assistance for patent filling for innovative process & products	5	100
4.	Technical consultancy services and networking	5	100
5.	Sugarcane is given more focus	5	100

Table 13 results show that, the most important strengths of the SBI- ABI were assistance for patent filling for innovative process & products (100%), technical consultancy services and networking (100%), sugarcane is given more focus (100%) and sugarcane based novel and commercialized products (100%). Followed by mentoring and capacity building programmes that got 40.00 percent.

Table 14: Weaknesses of the SBI- ABI

Sl. No.	SBI-KAU	Frequency	Percentage
1.	Non availability of dedicated labs and facilities	5	100
2.	Follow-up is inadequate	1	20
3.	Lack of awareness about ABI	5	100
4.	Less collaboration and capital investments	2	40
5.	Less experts on the sector	2	40

From the table 14, the major weaknesses of the SBI- ABI were both non availability of dedicated labs and facilities (100%) and lack of awareness about ABI (100%). The next major weaknesses were less collaboration and capital investments (40%) and less experts on the sector (40%) that had same percent. Finally, follow-up is inadequate had 20.00 percent and is considered as the least weakness of SBI-ABI.

Table 15: Opportunities of the SBI- ABI

Sl. No.	SBI-KAU	Frequency	Percentage
1.	Quality testing of samples	5	100
2.	Export opportunities	2	40
3.	Niche area and Less market competition	4	80
4.	Incubation and technology promotion	5	100
5.	Pilot scale facility	5	100

From the table 15, it was found that almost equal percentage (100%) was observed in incubation and technology promotion, pilot scale facility and quality testing of samples and were the most important opportunity available in SBI-ABI. It is followed by niche area and less market competition that had 80.00 percent. Then last opportunity available in SBI-ABI was export opportunities which got 40.00 percent.

Table 16: Challenges / constraints of the SBI- ABI

Sl. No.	SBI-KAU	Frequency	Percentage
1.	Non availability of venture capital	2	40
2.	Lack of necessary infrastructure for research and testing	3	60
3.	Low manpower	4	80
4.	Follow-up is difficult	4	80
5.	Limited funds	4	80

Table 16 shows, the most important challenges/ constraints faced by SBI-ABI were low manpower, follow-up is difficult and limited funds that got 80 percent. It is followed by lack of necessary infrastructure for research and testing that got 60.00 percent and the least challenges/ constraints faced by SBI-ABI was non availability of venture capital which had 40.00 percent of responses.

Conclusion

This research evaluates the strengths, weaknesses, opportunities and challenges/constraints of each ABIs that is selected for the study. The SWOC of KAU-ABI include product development and refinement, less publicity among public about incubation facilities, food analysis and quality control laboratory inside the incubator and shortage of separate fund for R&D. While the SWOC of TIC-CTCRI include tuber crops are more focused for increasing the value, enrolment of incubatees is less, scope for tuber crops exploitation and product diversification and lack of infrastructure. The SWOC of NABARD-MABIF include various schemes including IPFC, CBBO, CCF, huge cost of modern technologies, in-house production centre, breakdown cost is more. The SWOC of SBI-ABI include sugarcane based novel and commercialized products, non-availability of dedicated labs and facilities, incubation and technology promotion, low manpower. This data is useful to know the places of improvement for the incubators. However, there are differences in the mindset of agripreneurs in each district, funding and policies of each incubator.

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