

SFRN 2019

Security in
food,
renewable
resources,
and
natural
medicines



PROCEEDING

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**3rd INTERNATIONAL CONFER-
ENCE ON SECURITY IN FOOD,
RENEWABLE RESOURCES, AND
NATURAL MEDICINES 2019
(SFRN 2019)**



hosted by,
Politeknik Pertanian
Negeri Payakumbuh



co-Hosted by,
Universitas Andalas
(UNAND)

Convention Hall Politeknik Pertanian Negeri Payakumbuh
INDONESIA

QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF SUSTAINABLE DE- VELOPMENTS GOALS (SDGS)

September 25-26, 2019



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Welcome Message
**Executive Chairman of The 3rd International Conference on Security in Food,
Renewable resources, and Natural Medicines (SFRN) 2019**



Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikum wr.wb

On behalf of the SFRN 2019 organizing committee, I am really honoured and delighted to welcome all of you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the State Polytechnic of Agriculture Payakumbuh, West Sumatra Indonesia

Our technical program is rich and varied with 8 keynote speeches and 4 invited talks and more than 170 technical papers split between 8 parallel oral sessions and 1 poster sessions. The speakers and participants came from 8 different countries, consist of Academicians, Scientists, Researchers, Practitioners, Professionals, and Government Officials in multidiscipline branch of knowledge, who gathered here today to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and HealthCare Free for All, in particular for those who in needs. As the chairman of conference 2019 SFRN, I know that the success of the conference depends ultimately on the how many people who have worked in planning and organizing both the technical program and supporting social arrangements. This year, the conference is jointly organized by the Payakumbuh State Agricultural Polytechnic and Andalas University. We also thank to the steering committee for their wise and brilliant advice on organizing the technical program; and also to the the Program Committee, both from the Payakumbuh State Agricultural Polytechnic and Andalas University , for their thorough and timely reviewing of the papers and to the Director of Payakumbuh State Agricultural Polytechnic and the rector of Andalas University, and the Head of the Institute for Research and Community Service of Andalas University, and Payakumbuh State Agricultural Polytechnic. Our recognition should go to the Organizing Committee members who have all worked really hard for the details of the important aspects of the conference programs and social activities, and then we extend our gratitude to our students who bore the arduous burden for preparing this event.

We hope this event is also a good step in gaining strengthened cooperation between our universities as we know that the State Agricultural Polytechnic of Payakumbuh is part of the Andalas University previously, of course the psychological relationship between the State Agricultural Polytechnic and the Andalas University is really close.

Finally on behalf of the committee, we apologize profusely for all the shortcomings and everything that is not properly in organizing this event and hopefully AES-Network contributes significantly to the research and technology for the good of humanity.

Thank you

Fithra Herdian, S.TP, MP

**Message from Afro-Eurasia Scientific (AES) Network
3rd International Conference on Security in Food, Renewable resources, and
Natural Medicines (SFRN) 2019**



Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

On behalf of the AES Network, I am honored and delighted to welcome you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the Agricultural State Poly Technique of Payakumbuh, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture, delicacy and scenery of Payakumbuh, the city of "Rendang".

The AES-Network aims to Promote Livelihood Through Food Security, Promote Future Smart and Green Mobility by Using Renewable Energy, Promote Prosperity by Equally Managing and Distributing the Sustainable Resources and Promoting Enjoyable Long-Life by using Natural Medicines With Free Health Care For All. The AES-Network was established in 2018 and already have memberships from 12 countries. Our members consist of Academicians, Scientists, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledge, who gathered and contributed their expertise to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In particular, the network aims to alleviate the condition of those who in dire needs. In the future, we also expect to provide technical demonstrations, and numerous opportunities for informal networking for Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In this opportunity, we invited you to become our members and join our efforts for a better life to all of mankind.

As a team, we acknowledge the existence of mutual interest among university and college educators, researchers, activists, business sector, entrepreneurs, policy

makers, and all society members. We must promote the need to strengthen cooperation for establishing Security in Food, Renewable Resources, and Natural Medicines in Africa, Europe, and Asia.

The AES-Network believe, a firm foundation for mutual collaboration with the spirit of equality and partnership and thereby contribute towards sustainable development in these three regions.

Therefore, through networking, friendships, and joint efforts, the capacity of our network can be enhanced to address major challenges in securing the Food, Renewable Resources, and Natural Medicines in Africa, Europa, and Asia. Our Network goals are to increase the awareness of educators, researchers, scientific community, business sector, entrepreneurs, and policy makers in Africa, Europa, and Asia, that the future of a better world, lies within their responsibilities, and to improve the networking, mobility and mutual collaboration of scientific community, business sector, entrepreneurs, and policy makers in Africa, Europe, and Asia to energize the delivery of Sustainable Development Goals.

Finally, I hope that, by registering our network, you will be provided a common platform and support the exchange of knowledge, while at the same time, we offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrived at the best solutions to our terminal goal, Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care based on scientific evidence in Africa, Europa, and Asian region.

Thank You for Joining us!

President

Assoc. Prof. Dr. Eng. Muhammad Makky

Welcome Message
Head of Institute for Research and Community Service
Universitas Andalas



Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

It is with great pleasure that I welcome the participants of the SFRN 2019 in Payakumbuh, the city of “Rendang”, the prime of Indonesian delicacy.

In this esteem event, we share the knowledges, and imparted it to the people. The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that this conference will become a platform to gather and disseminate the latest knowledge which can be adopted for securing the food, resources, and health for mankind, in Asian, European and African region.

Academics, Scientists, Researchers and practitioners from multidiscipline branch of knowledge who gathered here today will be able to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who reside in developing countries. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on environmental and sustainability. Therefore, we urge to all participants, to establish a scientific network that will voice the needs

Researchers in the multi sectoral aspects related to the benefit of mankind have been progressing worldwide. Food is a basic right, while energy drive the world. Human need a lot of resources so the civilization can be flourished. But human is not immune, and thus, ones need to take care of their health regularly. Modern Agri-food systems is the foundations of a decent life, a sound education and the achievement of

the Sustainable Development Goals. Over the past decade, we have witnessed a chain reaction that threatens the very foundations of life for millions of the world's people. Rising energy prices drove up the cost of food and ate away the savings that people otherwise would have spent on health care or education. Unsustainable plantation management induced forest fire and posed haze hazard to the whole Sumatra island and our neighboring countries.

The human cost of the food and energy crisis has been enormous. Millions of families have been pushed into poverty and hunger. Thousands more suffering from the collateral effects. Over the past year, food insecurity led to political unrest in some 30 countries. Yet because the underlying problems persist, we will continue to experience such crises, again and again -- unless we act now. That is why we are here today.

We must make significant changes to feed ourselves, and most especially, to safeguard the poorest and most vulnerable. We must ensure safety nets for those who cannot afford food, or energy, nor even a health service. We must transform agricultural development, markets and how resources is distributed. We must do so based on a thorough understanding of the issues. That is the only possible way we can meet the Goals of Sustainable Development.

Thank You,

Assoc. Prof. Dr.-Ing. Uyung Gatot S. Dinata,MT.

**Opening Ceremony
Rector of Andalas University**



Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

I welcome the opportunity to address you at this important event.

It gives me great pleasure in welcoming you to this 3rd Conference on "Security in Food, Renewable resources, and Natural Medicines (SFRN)" 2019. I am delighted that so many have accepted our invitation. I am particularly happy that we have in this room, dedicated individuals from so many stakeholder groups — including our most respected and distinguished guest “The ministry of Agriculture of the Republic of Indonesia”. We also welcome the mayor of Payakumbuh and the Regent of Lima Puluh Kota. We extend our welcome to the civil society, the private sector, international organizations; the science community; and others dedicated to help create an environment in which people can escape food insecurity. Imagine what we can do together if we make the security for all as an our top priority, and pull in the same direction. We can make a difference in the lives of millions.

Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Sustainable Development Goals Access to medicines - a fundamental element of the right to health. Health is a fundamental human right, indispensable for the exercise of many other rights in particular the right to development, and necessary for living a life in dignity. Moreover, human rights principles and language are being used to support resource access claims as rights-based approaches empower individuals and groups to gain or maintain access to natural resources

Much progress has been made during the last decades but much more needs to be done. Millions of people are Insecure worldwide, meaning that they either starve or they do not know from where their next meal, health care or resources will come.

Much of the progress on security has occurred at the expense of our environment. With business as usual, we foresee that the production improvements during the next decade will be less than the last one, while the environmental degradation will continue, and health will deteriorate significantly. Without available resources to seek, mankind will become endanger species in a very short time.

Solutions to the security problems need to be designed and implemented within a new and rapidly changing environment. Globalization and sweeping technological changes offer new opportunities for solving these problems. A number driving forces or trends must be taken into account in developing appropriate action. Some of the action needed, such as appropriate technology for small farms, is not new but it must be cast in the new and changing global and national environment, taking into account new opportunities and risks. I hope that by providing a forum for knowledge exchange, this conference will help identify the action to be taken. Furthermore, this conference will help to provide constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions.

In conclusion, even if those responsible give high priority to achieving sustainable security for all and back it up with action, the world may not achieve the goal by 2030. But we will be much closer than with business as usual. I urge all of us to provide the strongest support for this event, to enable securing the food for all in the closest time possible. It is my sincere optimism that through the accomplishment of the objectives of this event, we will come to an important step nearer to secure the food for all.

Finally, I would like to thank the organizing committee who have spent their utmost efforts to prepare and manage this event successfully. Let me conclude my remarks by wishing our guests happiness, good luck and great success in the conference.

May I announce now the opening of the “3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019” in Payakumbuh.

Thank you.

Rector,
Prof. Tafdil Husni, SE, MBA, PhD

Welcome Message
Director of Politeknik Pertanian Negeri Payakumbuh



Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikumwr.wb

I congratulate to all participants on the invitation and participate at our beloved campus Payakumbuh State Agricultural Polytechnic. I feel really honoured to welcome all of you at our event, the 3rd International Conference on Security in Food, Renewable Resources, and Natural Medicines (SFRN) 2019 at the Payakumbuh State Agricultural Polytechnic, Indonesia.

Food security is a very important aspect in a country's sovereignty. Food also determines the future direction of a nation. Many social and political fluctuation can also occur if food security is disrupted. Food availability that is smaller than its needs can create economic instability. This critical food condition can even endanger economic and national stability. In the current situation, there are many challenges in exteriorize food security, such as climate change, population, limited natural resources and other challenges both locally, regionally and globally.

Renewable resources are also our starting point to start sustainable development. Research on renewable resources is also very important as the solution in meeting the principles of sustainable development. As we know that Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability is the foundation for today's leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)

The discovery of treatment based on local culture also contributes greatly to the good of humanity. Unfortunately, there are still many treatments that have not been carried out by scientific research. So, through this conference we hope it can be a trigger to increase in traditional plant-based treatments that not go through complex

chemical processes, so that the effectiveness of the pillars can be further suppressed and also contribute to the community's economy.

Finally, I would like to express my gratitude to all people who involved in organizing this event and to all of stakeholders who have helped to make this event go on successfully. Please accept my apologize for any shortage, Assalamu'alaikumwr.wb.

Thank you

Ir. Elvin Hasman, MP

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Strategies for Developing SMEs (Small and Medium Enterprises) of “Rendang” with Strengthening Regional Innovation Systems in Payakumbuh City

Amna Suresti¹, Uyung Gatot S. Dinata², Alizar Hasan³, James Hellyward⁴,
Rahmi Wati⁵

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Abstract. Rendang is one of the processed products based on meat products and is one of the leading commodities in the City of Payakumbuh. To be able to develop it towards industrialization, it is necessary to have a condition of innovation that enables the creation of the competitiveness of these products. The state innovation can be done at a macro level by the local government in terms of the innovation, institutional, and innovation capacity policies that support the development of the rendang industry in Payakumbuh. Research on the potential development of rendang industry-based Regional Innovation System (SIDa) has been conducted before (2017). The purpose of this study is to develop a strategy for developing small and medium industries (Rendang) in the City of Payakumbuh with SIDa approach. By using SWOT analysis and data collection techniques with Secondary data review (SDR), semi-structured interviews (SSI) and Focus Group Discussions (FGD) it was found that priority strategies for developing small and medium industries in "Rendang" products in Payakumbuh City have Turn strategies around which is a strategy to overcome weaknesses by exploiting opportunities. The strategy at the policy level is Payakumbuh city government facilitating regional policies to create an innovation system master plan to develop small and medium industries "Rendang" and the existence of regulations on rendang product innovation, 2) Building innovation institutions such as technoparks and innovation clusters, 4) Building cooperation with R & D institutions and universities related to processing technology innovation and 5) Increase the number of small and medium industries through incubation with the collaboration of the Government and universities

Keywords: Regional Innovation System, SWOT Analysis, Small and Medium Industries of Rendang, Payakumbuh City.

INTRODUCTION

The current innovation concept uses the NIS (National Innovation Systems) approach which consists of a network of academic, business and industrial institutions and is supported by central and local governments who act as policymakers and coordinators for macro perspectives since the performance of regional innovation systems is related to the national level. As innovation relates to the national environment and culture of innovation system strategies started at the

national level. However, with the emergence of localism in advance countries, the regional innovation system became more relevant and crucial to enforce innovation activities at the regional level. The differences in development orientation and vision in local policies have led to differences in development aim. Thus innovation policies also become local specific.

Strengthening the Regional Innovation System (RIS) is one of the policies of the central government, which is formulated in the Joint Regulation of the Minister of Research and Technology and Minister of Home Affairs Number 03 of 2012 and Number 36 of 2013 concerning Strengthening the Regional Innovation System. In the joint regulation, it is mandated that each region, both Province and Regency / City, establish a Regional Innovation System Strengthening policy (RIS), in which regional economic development planning becomes an integral part of the Regional Development Master Plan and is included in the Regional Medium-Term Development Plan and has a good influence in achieving the expected economic development goals. Especially in elaborating the potential to improve economic development and create profitable business opportunities in accelerating the pace of regional economic growth.

This paper was a study of the Regional Innovation System. An innovation system is a form of perspective/development approach that is carried out in a systematic, innovative, holistic, sustainable, by emphasizing collaborative work among regional development staff. The existence of innovation in development that runs comprehensively and the collaboration between development actors is a key factor in increasing competitiveness. Regional innovation system development(RIS) is one of the main strategies in the national innovation system that embodies the process of interaction between components of the strengthening of the innovation system. In other words, the innovation system can be interpreted as a unity of a set of development, institutional actors (including policies), interactions and productive processes that influence the direction of development and the speed of innovation and diffusion of innovation, including technology, and good / best practices and the learning process (Handayani,W. 2013). This is also supported by Atia, A. (Atia, AM,. 2015). which states that nowadays, several developing countries have tried hard to build a national innovation system to improve competitiveness by reducing poverty and increasing income distribution. To build an innovation system like that there is a need to build a well-constructed collaboration between the Government, universities, and industry.

The application of innovation is still constrained because the implementation does not have a mature and strong system so that it is carried out in a sectoral (individual agency), partial (not comprehensive for all aspects), momentary (not sustainable in every aspect), not intensive (participant fostered and limited budget), without quality assurance (there is no monitoring and evaluation of outputs, outcomes, and impact) and so on. For this reason, a comprehensive, integrated, sustainable, intensive and guaranteed quality system is needed for the implementation of innovations to improve competitiveness and economy in Region

The ability of a region to appropriately selecting the regional economic potential to be used as the subject of management of innovation will be one of the keys to the success of regional economic development. Thus the directed, integrated and sustainable SIDA strengthening process is a priority that must be carried out, in accordance with the mandate contained in the Joint Regulation of the Minister of Research and Technology of the Republic of Indonesia with the Minister of Home Affairs No. 03 of 2012 and No. 36 of 2012 concerning Strengthening Regional Innovation Systems (Taufik and Tatang A., 2005).

The livestock sub-sector has the most dominant role in the economic growth of Padang Panjang City. According to experience, the results of cattle, goat, chicken, and duck farms can be processed into value-added products. In fact, in Payakumbuh there are still a small number of types of processed products, namely new processed meat (meat rendang, egg rendang, meatballs), dairy products (curd, yogurt, and goat's milk), and processed skin (skin crackers) and with production capacity which is not big because Small and Medium Industries process it. But the City of Payakumbuh is one of the centers of snacks and “rendang” is an icon of the area and specific food of West Sumatra, which requires the intervention of local and central government to maintain sustainability amid the development of an increasingly modern era. Rendang or randang is a spicy flavored meat dish that uses a mixture of various spices and herbs. This dish is produced from a cooking process that is heated repeatedly with coconut milk. The cooking process takes hours (usually around four hours) to dry and solid black. At room temperature, rendang can last for weeks.

The number of small and medium-sized industries (SMIs) trying in downstream in Payakumbuh in 2014 are as follows: for meat processing, there are 29 business units of meat rendang and/or egg rendang, and eight business units of egg rendang, and ten units of meatball business; for milk processing, there are 12 business units of curd, and ten other dairy units; For processed leather, there are ten cracker business units. This shows that one of the superior products of the City of Payakumbuh is rendang (especially rendang meat, eggs, and chicken).

Appreciation of the local government together with the Payakumbuh community for the establishment of rendang as a product of identity for the City of Payakumbuh through the OVOP (One Village One Product) program by the central government established by the Ministry of Industry Republic of Indonesia. To strengthen the essence of Payakumbuh's identity as a destination city for culinary tourism in West Sumatra. Because in accordance with the concept of development, this area is one of the regional specific food production centers, mainly rendang with a variety of variants that are equipped with various supporting facilities such as parking areas, prayer rooms, toilets, and restaurants specifically for rendang and other facilities.

This study looks at the development of the rendang product industry from a macro perspective, which sees in terms of innovation, institutional and innovation capacity policies. Previous research had been carried out with a micro approach to the product itself but not many have researched rendang products with the regional innovation system approach.

Research on the potential development of RIS-based rendang business had been carried out (Suresti, A et al. 2017). and shows the results that the maturity of the regional innovation system for “rendang” in the City of Payakumbuh is still developing. Based on the background and reasons mentioned above, then in Payakumbuh City that already has the business potential of processing livestock products, it is very necessary to conduct an in-depth study of "Development Strategy for Small and Medium Industries processed livestock products (Rendang) by strengthening the Regional Innovation System (RIS) in Payakumbuh City ". The purpose of the study was to issue a recommendation for intervention in the form of a strategy for developing the Small and Medium Industries center of the rendang village in Payakumbuh City.

METHOD

The research method is a survey and desk study/literature study. The survey aims to obtain primary data about the strength and maturity of the innovation system as well as the condition of the Small And Medium Industry in Payakumbuh City. Desk study to get secondary data. This research was limited to the analysis and identification of mapping of the condition of Small and Medium Industries processed livestock products (Rendang) with the regional innovation system

Variables Observed

The variables used in this study are the identification of the potential strengthening of the Rendang Regional Innovation System in Payakumbuh City and are influential factors in each stage of the Analysis of Nations Innovations System method which consists of:

- a. Macro-level (policy), where at this level information will be asked about regional innovation policies, the master plan for the rendang industry, training and education, foresight R & D, rendang cluster policies, and regulation of rendang product innovation.
- b. Messo level (institutional and innovation support programs) where at this level information will be asked about innovation institutions such as technology transfer centers, technopark, technology incubators, clusters, business promotion institutions, innovation service providers, and innovation funding institutions. At the meso level, information will also be asked about innovation support programs for Science of Technology innovation financing schemes, basic research programs, applied research programs, joint funding schemes, Science of Technology innovation mentoring efforts, entrepreneurial support, cluster development programs, and international support.
- c. Micro-level (innovation capacity), where at this level information will be asked about universities, basic research institutions, private research institutions, innovators, private investors, entrepreneurs, Small and Medium Industries center of the rendang based on technology, large technology-based industries.

Types and Data Sources

Data collected in this study were primary data and secondary data. Primary data was obtained from the results of interviews with respondents. Secondary data obtained from the results of previous studies and various literature. The primary secondary data comes from the statistics office. Other sources were obtained from relevant agencies, such as the Livestock Service Office, the Regional Development Planning Agency and the Agriculture Service or other agencies and institutions related to the research objectives.

Data Processing and Analysis Methods

The research method used in this study is a qualitative descriptive method. The type of descriptive research used is Case Study. This study used data collection techniques with Secondary data review (SDR), semi-structured interviewing (SSI) and Focus Group Discussion (FGD). Nonetheless, secondary data collection is carried out if in the findings of the synthesis of policy instruments readiness there are things that are not synchronous between variables. Data collection techniques that will be carried out are document review and in-depth interviews with actors related to things that will be verified. Technically, the determination of the agency/actor and interview material can only be done.

The potential of Small and Medium Industries processed livestock products (Rendang) in Payakumbuh City is seen from the complete determinants of the National Innovation System Analysis. This approach is based on indicators that rely on quantitative data generated by evaluation interviews.

Data analysis

SWOT analysis (SWOT analysis)

An organization is considered to have good performance, if the organization produces output in the form of goods or services effectively, efficiently and sustainably. Organizational performance is influenced by internal factors originating from within the organization, and external factors originating from outside the organization. Through analysis and evaluation of these factors, the capabilities of the organization can be known, and strategies can be formulated to improve the performance of the organization SWOT is a simple technique to develop the strategy and the policy for an organization or industry (David, F R. 2017). The initial step done in SWOT analysis is composing SWOT matrix that contains a list of strengths, weaknesses, opportunities, and threats. SWOT matrix also shows the interaction between internal and external aspects that will form alternative strategies (Table 1).

Tabel 1. Matrik SWOT

	SW	S	W
OT	Determine 5-10 strength factors	5-10 internal factors	Determine 5-10 internal weakness factors
O	Strategi SO		Strategi WO
Determine external factors	5-10 opportunity strength factors	Create strategies that use to exploit weaknesses	Create strategies that minimize weaknesses to take advantage of

		opportunities	
T	Strategi ST	Strategi WT	
Determine internal threat factors	5-10 Create strategies that use strength to overcome threats	Create strategies that minimize weaknesses to avoid threats	

Sampling Techniques

Sampling uses the sampling method. Given the limitations of ability, time and cost, the writer uses the purposive sampling method. The respondents used in this study were stakeholder actors. This choice is useful to find out the extent to which the form of coordination from stakeholders relates to the readiness to implement RIS for the West Sumatra Livestock Industry, which consists of universities, the private sector, the government, and the community.

RESULTS

The findings of the analysis from the research of Small and Medium Industries rendang profiles in Payakumbuh City were followed up with internal and external environmental analysis. Determination of strategy patterns for the development of small and medium-sized industries of SMI Rendang quantitatively pays attention to internal and external conditions with the following criteria. The conditions of small and medium enterprises in Payakumbuh City are classified in the macro dimensions, institutional, program and micro dimensions. The aspects that appear in this study include various components that are related both directly and indirectly in the business cycle of small and medium enterprises

A. Internal factors.

Internal factors will explain the strengths and weaknesses of each macro, meso, and micro level.

Macro Level

Macro-level includes policies and regulations on innovation in the City Government in order to increase the competitiveness of Small and Medium Industries center products. Strengths for the macro level in Payakumbuh City are:

1. There are policies for education and training that have often been done to increase the knowledge capacity of Small and Medium Industries.
2. The existence of regional visions and commitments to improve business and product competitiveness.
3. Rendang is Payakumbuh City One Village One Product (OVOP)
4. There is a policy for the development for increasing business Small and Medium Industries of Rendang

Weaknesses in the macro level for the development of SMEs

1. The master plan for the development of Small and Medium Industries of Rendang in Payakumbuh City has not yet been arranged.
2. Not yet applied the regional innovation system for the development of Small and Medium Industries of Rendang

For institutional and program institutions, the strength that already exists in Payakumbuh City for the development for Small and Medium Industries of Rendang center is:

1. The establishment of business promotion institutions that have been carried out by Payakumbuh Government
2. The establishment of Innovation funding institutions.
3. The existence of a joint funding scheme in the development of Small and Medium Industries of Rendang
4. The establishment of applied research especially for rendang product innovation
5. There is a Cluster development program
6. The establishment of entrepreneurial facilities

Weaknesses for institutional and program institutions :

1. There is no institution that can facilitate the development of Small and Medium Industries in a more independent direction such as the absence of a Technology Transfer Center, incubators and cluster Industries
2. The absence of innovation service providers

For the micro level, the strengths that have been established in Payakumbuh City is:

1. A high level of commitment of SMIs to meet market needs in terms of quantity, variety, and quality is a market attraction.
2. The number of Small and Medium Industries of Rendang and entrepreneurs in the City of Payakumbuh is high.
3. Most practitioners of Small and Medium Industries of Rendang have a relatively good entrepreneurial mentality.

Micro-level weaknesses:

1. Lack of Capital and Limited Access
2. Low Quality of Human Resources (HR)
3. Weak Business Network and Market Penetration Capability
4. The limited information system of price management and the market for materials and products results in a relatively low exchange rate for products.

B. External Factors.

These external factors explain the opportunities and challenges possessed by the Rendang Business in Payakumbuh, Various opportunities need to be identified and utilized as much as possible to strengthen the regional innovation system and also regional competitiveness. With these opportunities originating externally, the Payakumbuh City Government does not need to mobilize too many resources as many partners at the provincial and national levels have the same platform in increasing product, business, and regional competitiveness. Opportunities need to be identified, both from the present and in the future.

Opportunities for developing Small and Medium Industries rendang centers in Payakumbuh City include:

1. Vision, commitment, resources, and capacity of central coaching and innovation of partners (academic, business, and central government) towards very high competitiveness
2. Opportunities for budget assistance for the establishment of technopark, incubation, and product competitiveness from the Central Government in the City of Payakumbuh.
3. There have been six national Small and Medium Industries cluster programs through the Directorate General of Small and Medium Industries of the Ministry of Industry.
4. The potential of agricultural products in the area around Payakumbuh as raw material is very abundant.
5. Potential foreign and overseas markets are quite high, including demand for food and halal products

Threats for developing Small and Medium Industries rendang centers in Payakumbuh City include:

Various challenges or threats must be identified and anticipated as minimally as possible from the slowdown and decrease in the strengthening of regional innovation systems and regional competitiveness. With these challenges originating externally, the Payakumbuh City Government must exert strength and eliminate unnecessary matters in increasing the competitiveness of products, businesses, and regions. Challenges also need to be identified, both from the present and in the future. The challenges of the Regional Innovation System for the development of the current and future “Rendang” Payakumbuh include:

1. Business competitiveness and competitiveness of other regions increase
2. Maturity and strength of SMEs in other regions have increased.
3. The number of types, added value, production capacity, marketing and competitiveness of other regional and foreign products increases
4. There have been various innovation institutions in other regions

Strategies for Developing of Small and Medium Industries of Rendang

To determine the strategy for the development pattern of the Small and Medium Industries Center, an analysis of strengths, weaknesses, opportunities, and threats is summarized in the SWOT analysis so that it can be formulated in the following table.

The mapping of the small and medium industries of Rendang development strategy priorities was carried out using an analysis of Internal and External Factors, namely Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS). The stages in compiling the table of Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) are (a) determining the factors that become strengths and weaknesses as well as opportunities and threats of SMEs, (b) giving the weight of each factor from the scale of 0, 0 (not important) up to 1.0 (very important), where all these weights do not exceed the total score of 1.00, (c) calculate the rating for each factor by providing a scale ranging from 1

(below-average) up to 4 (very good), and (d) calculate the score value which is the multiplication between weight and rating. Rating values of strengths and weaknesses are always the opposite, as are rating and opportunity and threat ratings. The determination of the weight value and rating is based on the opinions of the Small and Medium Industries experts and the leaders of the SMI. The weighting results, ratings, and score scores for each internal and external factor are presented in Table 4.15 and Table 1

Table 1. Internal Factor Analysis (Summary Matrix)

No	Internal Factories	Value	Rating	Score
Strength				
1	The existence of policies for education and training that have often been done to increase knowledge capacity for business actors.	0,075	3	0,225
2	There is a policy for the development of small and medium industries of rendang centers.	0,075	4	0,3
3	The existence of business promotion institutions that have been carried out by the Payakumbuh Government.	0,025	4	0,1
4	The existence of a Cluster development program.	0,05	3	0,15
5	The high commitment of SMIs to meet market needs in terms of quantity, variety, and quality is a market attraction.	0,025	4	0,100
	Total	0,25		0,875
Weaknesses				
1	The lack of a master plan for developing small and medium industries of rendang centers in Payakumbuh City.	0,2	2	0,4
2	Not yet applied the regional innovation system for the development of small and medium industries of rendang	0,1	2	0,2
3	There is no existing institution that can facilitate the development of small and medium industries of rendang in a more independent direction, such as the absence of a Technology Transfer Center, technicians, and business incubators.	0,1	2	0,2
4	Lack of Capital and Limited Access	0,15	1	0,15
5	Low Quality of Human Resources (HR)	0,1	1	0,1
6	Weak Business Network and Market Penetration Capability	0,05	2	0,1

7	The limitation of the price management information system and the market for materials and products results in a relatively low exchange rate for products.	0,05	2	0,1
	Total	0,75		1,25

Table 1. shows that the score for the strength factor is 0.875, and the score for the weakness factor is 1.25. Meanwhile, Table 4. shows that the score for the opportunity factor is 3.00, and the score for the threat factor is 2.00. The value of the strength score turns out to be above the value of the weakness score with the difference in value (-) 0.375, while the value of the opportunity score turns out below the threat score with the difference in value (+) 1.00.

Tabel 2 Matrik External Factor (Analysis Summary)

No	External factories	Value	Rating	Score
opportunities				
1	Vision, commitment, resources, and capacity of central coaching and innovation of partners (academic, business, and central government) to very high competitiveness.	0.25	3	0.75
2	Opportunities for budget assistance for the establishment of technopark, incubation, and product competitiveness from the Central Government in the City of Payakumbuh.	0.20	3	0.60
3	There have been six national small and medium industries cluster programs through the Directorate General of Small and Medium Industry Ministry of Industry.	0.20	3	0.60
4	Have many Potential agricultural products in the area around Payakumbuh as raw material	0.20	3	0.60
5	Potential foreign and overseas markets are quite high, including demand for food and halal products	0.15	3	0.45
	total	1		3
Threat				
1	Business competitiveness and competitiveness of other regions increases	0,2	2	0,4
2	Maturity and strength in other regions increase	0,25	2	0,5
3	The number of types, added value, production capacity, marketing and competitiveness of other regional and foreign products increased	0,27	2	0,54
4	Various innovation institutions have been established in other regions	0,28	2	0,56
	Total	1		2

Source; data processed (2017)

These results indicate the condition of the small and medium industries of Rendang products in Payakumbuh City is in quadrant II, which means that the

strategy of developing SMIs is the WO strategy, namely the strategy of using opportunities (opportunity) to overcome weaknesses (Weakness). This strategy is also known as the stability strategy.

If referring to this strategy, the small and medium industries of Rendang products should make improvements at the macro level, namely in the form of a master plan for business development by the City Government, improvement of institutional innovations such as technology transfer centers, technicians and collaborator.

Based on the evaluation of internal and internal factors external results obtained strategic positions the development of the small and medium-sized industry of rendang products that are competitive at Payakumbuh City is a supportive turn around strategy with coordinates (-0.37; 1) (Figure 1). Refers to position strategic development that has been formed,

strategy formulation will be focused on strategy WO, which minimizes weaknesses so that it can take advantage of opportunities or take advantage of opportunities to minimize weaknesses.

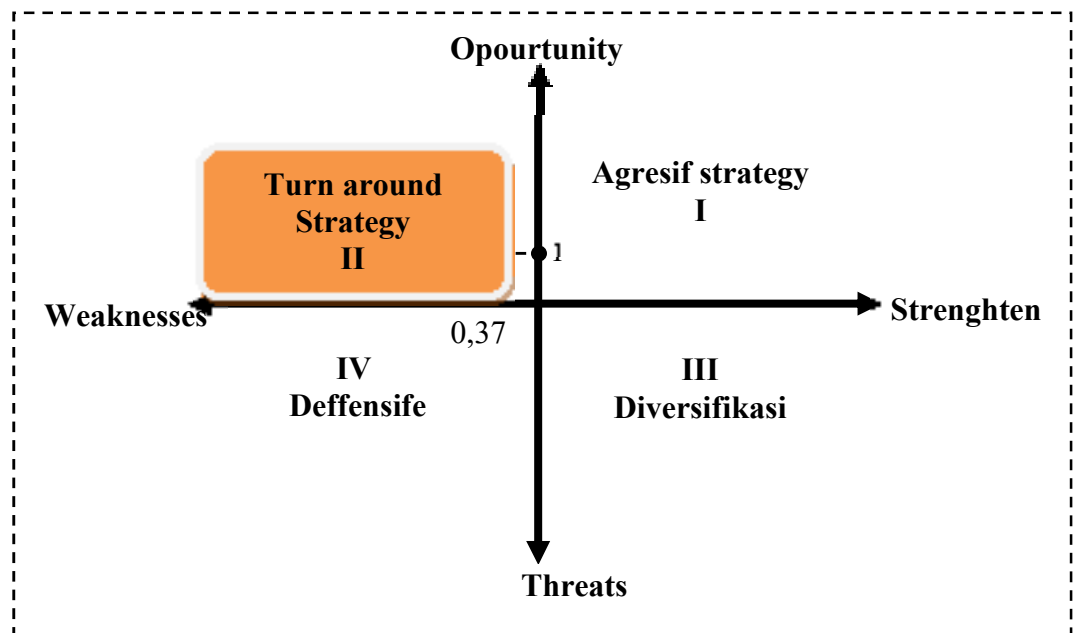


Figure 1. SWOT Kartesius Diagram

Figure 1; Development plan strategic position small and medium industries rendang products in Payakumbuh

The picture above shows that the condition of small and medium industrial businesses of rendang products in Payakumbuh has a condition that is still developing and not yet established. Weaknesses faced by business actors are tackled with the presence of regional innovation systems, will be able to improve business competitiveness. The research reveals that the priority strategy for developing small and medium industrial of “Rendang” products in Payakumbuh City is Turn around strategy. It means that the organization has huge (external) opportunities, but on the

other hand, it faces several internal obstacles/weaknesses. The focus of this organization is to minimize the internal problems of the organization so that they can seize opportunities from the outside well.

It is expected that the presence of supporting elements in the form of institutional innovations that also play a role as centers of innovation can strengthen the element of "business" within the Framework elements of Regional Innovation System Development. Within this framework, the innovation center for small and medium industries and plays a role as a node of a partnership network that provides integrated services for developing innovative small and medium industries both through improving the performance of existing small and medium industries and innovative new small and medium industries development. Integrated services that can facilitate innovation within the small and medium industries, which include: 1). Technology-based services, 2). Development of human resources in small and medium industries, 3). Intermediation of small and medium industries business, and 4). Facilitation of access to business financing.

Table 3. Alternative strategy for the development of Rendang Small And Medium Industry centers in Payakumbuh City

	<i>Strength (S)</i>	<i>Weakness (W)</i>
Internal factories	<ol style="list-style-type: none"> 1. There is a policy for education and training that has often been done to increase the knowledge capacity small and medium industries. 2. There is a policy for the development of Rendang small and medium industries. 3. centers. 4. The existence of business promotion institutions that have been carried out by Payakumbuh Government. 	<ol style="list-style-type: none"> 1. The master plan for the development of small and medium industrial of rendang centers in Payakumbuh City has not yet been arranged. 2. Not yet applied the regional innovation system for the development of small and medium industrial rendang 3. There is no institution that can facilitate the development of small and medium industrial in a more independent direction such as the absence of a Technology Transfer Center, technicians and business incubators.
Eksternal factories	<ol style="list-style-type: none"> 5. There is a Cluster development program. 6. The high commitment of the small and medium industrial to meet market needs in terms of quantity, variety and quality is the market attraction. 	<ol style="list-style-type: none"> 4. Lack of Capital and Limited Access 5. Low Quality of Human Resources (HR) 6. Weak Business Network and Market Penetration Capability 7. The limited information system of price management and the market for materials and products results in a relatively low exchange rate for products.

	<i>Strength (S)</i>	<i>Weakness (W)</i>	
<i>Peluang/Opportunity (O)</i>	<p>1. 1. Vision, commitment, resources, and capacity of central coaching and innovation of partners (academic, business, and central government) to very high competitiveness.</p> <p>2. Budget assistance opportunities for the establishment of technopark, incubation, and product competitiveness from the Central Government in the City of Payakumbuh.</p> <p>3. There are six national small and medium industrial (Small and Medium Industry) cluster programs through the Directorate General of small and medium industrial of the Ministry of Industry.</p> <p>4. Potential agricultural products in the area around Payakumbuh as a very large raw material</p> <p>5. The foreign and overseas market potential is quite high, including demand for food and halal products</p>	<p>S-O strategies:</p> <ol style="list-style-type: none"> 1. Accelerating the development of small and medium industrial Centers 2. Acceleration of infrastructure development supporting the existence of the Rendang small and medium industrial Center. 3. Expanding of the market to meet domestic and national markets. 4. Accelerate various innovations to increase added value, production capacity and competitiveness with the cooperation of the central government and various partner institutions. 5. Increase in technology-based business that produces added value and high production capacity and affordable prices 	<p>O-W strategies:</p> <ol style="list-style-type: none"> 1. Facilitating regional policies to create a master plan for developing small and medium industrial Centers 2. Strengthening RIS(Regional Innovation Systems) for the development of Centers. 3. Building innovation institutions to support the development of Rendang small and medium industrial centers 4. Building cooperation with R & D institutions or universities related to processing technology innovations 5. Increasing the number of small and medium industrial through incubation with the cooperation of the Central Government and various partner institutions

	<i>Strength (S)</i>	<i>Weakness (W)</i>	
Tantangan/Threat (T)	1. Business competitiveness and competitiveness of other regions increase	S-T strategies: 1. Improve business competitiveness and competitiveness of the Payakumbuh area by establishing and increasing the maturity and strength of RIS	W-T strategies: 1. Increased HR (managers and business actors) 2. The synergy of the development of industries in the regions with the central government
	2. Maturity and strength in other regions increase	2. Increasing diversification with innovation in the number of types, added value, production capacity, marketing and competitiveness of Payakumbuh products to other regions and abroad	3. 3. Maintain and prioritize the increase in added value and production capacity of the types of products that have been superior but with a low level of competition.
	3. The number of types, added value, production capacity, marketing and competitiveness of other regional and foreign products increases	3. Establish various institutions and strengthen the capacity of Payakumbuh innovation actors	
	4. There have been various innovation institutions in different regions		

CONCLUSION

From the results of research on the existing condition of small and medium industries Rendang products based on the Regional Innovation System in Payakumbuh city, the priority strategies are Turn Around that are strategies to overcome weaknesses by taking advantage of opportunities. The strategy at the policy level is facilitating regional policies to create an innovation system master plan to develop small and medium industries "Rendang" and the existence of regulations on rendang product innovation, 2) Building innovation institutions such as technopark and innovation clusters, 4) Building cooperation with R & D institutions and universities related to processing technology innovation and 5) Increase the number of small and medium industries through incubation with the cooperation of the Government and universities. In other words, it is possible if the city of Payakumbuh begins to reorganize the Small and Medium Industries engaged in this sector in a cluster building. The arrangement of SMEs (Small and Medium Industries) in a cluster building will be better able to support the sustainability of the system in strengthening regional economic fundamentals when compared to allowing

them to move individually because structuring Small and Medium Industries in a cluster can create a collaborative work climate that enables more innovative knowledge sharing process become more effective between Small and Medium Industries and its business network.

SUGGESTION

There needs to be coordination, positive cooperation, and synergy, and interaction between innovation actors in a Triple Helix network, namely actors from universities (Academic), government (Government) and business people (Business) in the Strengthening of Regional Innovation Systems (RIS) related with the utilization of the potential of small and medium industries of rendang in the City of Payakumbuh so that it can support the acceleration of development of small industries to medium industries.

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