Scale up strategy of smoked fish home industry Using SAST and AHP
A Case study in Kendal District, Central Java Indonesia

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ABSTRACT

Smoked fish is one of the most potential home industry in Kendal regency central java province. It has a big impact to family economic development for poor people, and able to absorb a very large workforce. Although its role is very significant, but the government's attention is still very minimal, and most of their lives are still not prosperous. The purpose of this research is to develop a business scale up strategy in accordance with objective of home industry entrepreneurs condition using the SAST and AHP method.

The results of study showed that government’s support and policy through guarantee of raw materials is the most important factors for ensuring sustainability of smoked fish home industry, while to increase their business scale product diversification is the most appropriate strategy. There are two actors who have a big role in the development of smoked fish home industry in Kendal Regency, Regional Planning and Development Agency and Regional People Representative Council.

Key Word : Home industry, Smoked fish, gender responsive, SAST, AHP

1. Introduction

Indonesia has enormous marine and fishery resources and has great potential to be used as a driver power of economic development based on natural resources, with an ocean area of about 5.8 million km (2019 KKP) the potential of Indonesia's marine fish resources, estimated at 6.5 million tonnes / year, however the utilization and management of natural resources is still not optimal. During the last 20 years,
processed fish production has only ranged from 23-47 percent and most of this amount is traditionally processed. This means that there is still a lot of potential that has not been utilized.

Smoking fish is a method of processing or preserving fishery products by using heat treatment and providing natural chemical compounds as a result of burning from wood or other natural fuels. Through the combustion process, smoke will be formed which will stick to the fish so that it will produce a distinctive aroma and flavor to the fish with an attractive yellowish or golden brown color. In addition to producing a distinctive aroma and taste, the smoking process is also used to extend the life of the fish. This is because the chemical compounds resulting from smoking can become antioxidants even in low concentrations. The longer the fish is smoked, the more chemical compounds are formed during the combustion process, thus, the fish products from smoking will be more durable.

Kendal Regency is one of the north coast regions of Java which has very potential fishery resources, to support economic development. Located on the northern coast line and directly adjacent to the city of Semarang, the capital of Central Java province. Kendal Regency is geographically located at the position of 109° 40'-110° 18' East Longitude and 6° 32'-7° 24' South Latitude with an area of about 1,002.23 km² or 100,223 hectares with an altitude ranging from 4-641 m above sea level. To improve community welfare, the government has encouraged the development of home industries based on local superior resources. PSP –IPB (2012) has identified fishery-based home industries as the most potential productive activities, according to the geographical position of the Kendal Regency.

Home industry is one of the potential sectors that allows to support regional economic development. Since 2012 Kendal Regency has been designated as a pilot project of home industry development by the government of Indonesia. This is because the government’s attention which is shown by the government’s policy for the home industries development through medium-term development plans (Bappeda Kendal 2018). Local government policy requires all Corporate Social Responsibility (CSR) of private companies and State Owned Enterprise (SOEs) to support the development of a
home industry. Despite their significant role in family economic development, as a part of MSMEs (small, micro and medium enterprises), there are still many obstacles, especially legality, human resources, capital, and marketing (PSP IPB 2012; Taufik and D. Jatmika, 2017). Therefore, home industry still need special attention from the government. The number of MSMEs including home industries is estimated 62 million; with total workforce 130 million (Ministry of SME 2018). Based on this role, home industries are referred as an economic safety nets or social safety nets. And also significantly increased the income of housewives, so it is very potential to be developed (Syahdan & Husnan 2019).

One of the most potential home industry according to geographical position of Kendal Regency is smoked fish (Bappeda Kendal 2018). There are an estimated 15,000 groups of business actors with an average of 3-6 workers especially in the two districts of Weleri and Cepiring. This shows that smoked fish home industry provides a very large role for local economic development in Kendal.

Almost of smoked fish home industries are managed by women especially for beginner. This activity is carried out together with daily family activities in the house, and there is no separation of management between household finances and business finance (Kholil, N.B. Sukamdani, and N.Nurhayati 2016). Most of smoked fish home industries in Kendal Regency are beginner groups characterized by unsustainable production, limited capital (1-1.5 million), limited workers (2-3 people) and still using simple / traditional technology. The production process is carried out with low sanitation and hygiene, using low quality raw materials, and very simple technology and equipment hereditary. In addition, the infrastructure owned is very minimal, so cross-contamination is very likely due to repeated use of water, unclean production sites, and very simple storage systems, so food security is not guaranteed. The marketing system is also still very limited, just waiting for the middlemen to come. There is no institutional business actor, which allows mutual cooperation and avoids competition (Bappeda Kendal 2018).

The facts above showed, although the smoked fish industry has a very big role in the economic development of the community, it’s still faces serious problems including limited capital, skills, and technology, and very limited access to market, so the business cannot develop. The purpose of this study is to develop the most appropriate strategy to
increase business scale of smoked fish home industry. This results is very necessary and will be an important input for local government in design and scale up the business of smoked home industry according to its object condition.

2. Literature review

Home industry is a small industry which is integrated with household activities (PSP3-IPB 2012); that employ fewer than six people, limited capital, and integrates with household activities, and all of workers are family (Sujatmiko 2014). Home industries (HI) have major role in economic and family welfare. One of the most important roles is absorption a very large workforce, to reduce unemployment (Sunarso 2010). It’s also has great potential to support national economic resilience, because the system is able to increase the added value of local resources to micro-scale businesses that are spread throughout the archipelago, both in urban and rural areas. The obstacle of the development of the home industry is their character as an informal sector which has a low level of sustainability, low technology and unskilled labor (Taufik and D. Jatnika 2017; Ariany 2017; Wang 2016). According to Muliawan 2008 and Harimurti 2012, home industry is able to survive and anticipate an economic slowdown caused by inflation and various other causes. Some of the advantages of home industry include: (1) opening up new jobs (2) empowering the surrounding community, (3) the owner manages independently and flexible working (4) effective, because the owner is also the manager of the company who carries out all managerial functions such as marketing, finance and administration. While the disadvantages are (1) owner do not have reliable managerial skills; (2) Lack of a long-term planning system, an adequate accounting system, budget requirements, capital, organizational structure and delegation of authority (3) Lack of business information, only refers to the manager's intuition and ambition, weak in promotion, (4) disproportionate division of labor, managers often have abundant jobs or employees who work outside the standard working hours limit; and cooperation between home industry entrepreneurs is weak. While Hoetoro (2014) stated that cooperation and business strategy development is very important for MSMEs to ensure business sustainability.
Based on the research results of the Ministry of Women’s Empowerment and Child Protection (KPPA) and CS (Center for System) 2013, the classification of home industry can be grouped into three types based on the level of business sustainability, capital, production, process technology used, number of workers and sales system: (1) Beginner, this group is generally discontinuous production or based on specific customer requests on a particular day. Meanwhile, the other days are not producing. The sales system is loose, this mean that after the product is sold there are no longer ties with consumers. This group is prone to bankruptcy due to an erratic production system. Business financial management still integrates with the family finances. There is no separation between family finances and business finances. The capital is still relatively small according to one's own capacity, which is around 1-5 million rupiah. The production process is still simple, which is done manually without a machine. The number of workers is still small, around 1-2 people including the owner. (2) Developing, this group of home industry is generally semi-continuous production with a sales system is still loose. Their products easy to change when the sales prospect of the product is decreased. Its capital is still relatively small according to its own capacity and has begun borrowing funds from non-formal Microfinance Institutions (LKM), which is around 5-25 million rupiah. The production process uses technology even though it is still simple, the number of workers is around 2-5 people including the owner. Their marketing scope is wider, but it is still done manually. (3) Developed, this group generally has continuous production with a certain sales system. The business management system is relatively good, so the level of business sustainability is relatively high. The capital is around 25 - 50 million rupiah which comes from personal and credit from formal microfinance institutions. The production process already uses high technology, the number of workers is around 5-10 people including the owner. But they still don't have business legality. Business activities have been separated from household activities. There is already a division of labor from the workers. Some of this group have used promotion using social media.

According to Agusni et al. 2015, and Sunarso 2010, there are three home industry group. They are: (1) Startup home industries which is characterized by 1-2 workers whom all members are family, non-continuous production and average income/month 1-5 million. (2) Developing home industries which is characterized by continuous production and fixed
sales system, capital is around 25 - 50 million rupiah of personal assets and microfinance credit. 2-5 workers, and (3) Developed home industries characterized by 5-10 workers including the owner, bank credit, production process using technology, business and finance are managed professionally.

The problems faced by the three groups of home industries are different, as in the following table (Kholil et al. 2017):

Table 1. Types of home industry’s problem

<table>
<thead>
<tr>
<th>Beginner</th>
<th>Developing</th>
<th>Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Own capital is limited</td>
<td>a. Limited capital</td>
<td>a. Packaging</td>
</tr>
<tr>
<td>b. Business management</td>
<td>b. Marketing</td>
<td>b. legality</td>
</tr>
<tr>
<td>c. Marketing</td>
<td>c. Technology</td>
<td>c. Promotion</td>
</tr>
<tr>
<td>d. Technology</td>
<td>d. Waste treatment</td>
<td>d. Networking</td>
</tr>
<tr>
<td>e. Waste treatment</td>
<td>e. Business continuity</td>
<td>e. Raw material</td>
</tr>
<tr>
<td>f. Business continuity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most of home industries are managed by women especially for beginner, but their participation rarely recognized (Sunarso 2010). While Qosasi et al. 2019; Istiqomah and W.R. Adawiyah 2018, stated that there are three main problems faced by home industry: limited capital, managerial capabilities; and market access. The key success factor determined by women behavior (Husain, Li Xiao Xiao 2016).

The current objective conditions of the home industry are still facing several obstacles and constraints, so it is important for the government to increase the business scale and income of business actors (KPPA and CS 2013), namely: (a) access to capital, (b) database development, (c) capacity building (c) infrastructure development (d) synergies and cooperation with partners and academics, and (e) developing linkages between companies for market access and capital assistance.

The technologies used in home industries is very simple and all of production process is manual (handmade), moreover, they rely on their own capitals not on the bank’s capital (Widiastuti et al. 2011). While Husain, Li Xiao Xiao 2016 stated that women leader in Small Medium Enterprise (SME) have a stronger motivation and spirit of the men, and women are more patient and resilient than men in dealing with business
constraint. But Pasaribu (2017) stated that there is little evidence that female directors have a positive and strong relationship with firm performance. One of the most potential home industry in Kendal regency is smoked fish industry, and it has been developed in almost region of Kendal regency and absorbed a large workforce (PSP3-IPB 2012; Kholil, N.B. Sukamdani, and N.Nurhayati 2016).

Smoking is one way of cooking fish by giving aroma, or the process of preserving food, especially meat and fish. Fumigation is defined as the absorption of various chemical compounds derived from wood smoke which is burned into fish meat through smoking which results changes in fish color, taste and texture (Sulistiowati et al. 2011; Sulfiani, A. Sukainah, and A. Mustarin 2017). According to Belichovska, D. Belichovska, Z. Pejkovski (2019) smoke is a source of heat and of the basic components responsible for the effects of smoking on fish. The composition and properties of smoke depend on the type of wood, its chemical composition, physical properties and burning conditions. Smoked fish with an unattractive colour and a bitter taste of resin are obtained if the humidity of raw wood smoke is more than 50%. Moreover, the necessary extraction of water from the fish practically does not occur if the humidity of the smoke is 75–80%.

Fish smoking is a method of processing or preserving fishery products using heat and natural chemical compounds imparted from burned wood or other natural materials. The burning process will generate smoke, and it will be absorbed into the fish, producing a distinctive aroma and flavor for the fishery products, with appetizing brownish or golden yellow color, (Kusmajiadi et al. 2011). In addition to producing a distinctive aroma and flavor, the smoking process can also extend the shelf life of fishery products. This is because the chemical compounds from the smoke can act as antioxidants, even in low concentrations (Sulistiowati 2011). The longer the smoking duration of the fish, the more chemical compounds formed during the wood burning process, resulting in the longer shelf life of the fish. It is one of the processed fishery products favoured by consumers both in Indonesia and abroad for its distinctive taste and aroma. But Duangsai, and Somsamorn Gawborisut, 2020 stated that fish dried at 80 °C had significantly lower sensory colour scores than those dried at 40 or 60 °C, therefore the right temperature and time are needed so that smoked fish are not damage. According to Sulfiani, A. Sukainah, and A. Mustarin 2017 stated that the most optimal smoking time is 6 hours at 50° C, by this treatment
content water will be 8.7 %, protein 24.63 % and ash 13.36 %. Based on the temperature used, there are three types of fumigation: smoke hot smoking, moderate smoking (semi-hot smoking), and cold smoking smoking). Heat smoking uses temperatures of or exceeding 100°C, while temperatures are cold fogging ranges at 40°C (Yulstiani 2008).

However, as a food industry, fish smoking activities must follow the basic principles of good food production for the home industry, namely CPPB (good food production methods), as stated in the Regulation of the Head of the Food and Drug Administration of the Republic of Indonesia Number HK.03.1.23.04.12.2206 of 2012. The principles of implementing CPPB for processing fishery products are 4Q, namely: a) Quick: fishery products are easy to change in quality and rot so they must be processed immediately, b) Care / caution: handling of fishery products both fresh and processed must be careful and avoiding coarse processing which results in a decrease in quality and selling value, c) Clean: processing of fishery products should be carried out with clean equipment aimed at inhibiting microbial activity and rotting enzymes, d) Cool: the use of low temperatures aims to inhibit the process, biochemical breakdown of fish nutrition and extend shelf life. In principle, selecting good quality raw materials will result in a good quality final product.

Smoked fish home industry has expanded extensively in Kendal Regency, with around 15,000 businesses with an average workforce of 3 women. Most of them are the beginner which an average income around IDR 1.5 million-2 million/month. Some of the real problems faced by this industry are: (1) limited capital, (2) unskilled labor (3) limited facilities and technology, (4) limited market access; (Widiastuti et al. 2011). According to Hartati, L. Kurniasari, Darmanto and Hasan 2013 there are some weaknesses of smoked fish home industry in Kendal regency: the use of conventional stoves, traditional production methods, and unprofessional of business management systems. There are 3 groups of home-based smoked fish industry in Kendal Regency: (1) beginner; (2) developing and (3) developed. Beginner group and developing group are similar in some aspects. The two things that distinguish them from one another is the scale and the turnover of their business. The beginner group’s earnings is about IDR 1.5-2.0 million/month; while for developing group is about IDR 2.5-4.0 million/month. But their characteristics are similar, including: simple technology, home-based activities, and limited facilities. The developed group is characterized by: (1) already using modern technology, (2) offering
product diversification, (3) using information/digital technology, (4) already using banking services; and (5) average turnover reaching up to 10.0 million/month. Most of them (85%) are beginner groups, followed by developing group (12%), and developed group (3%), (Kholil, N.B. Sukamdani, and N. Nurhayati 2016). The role of the smoked fish home industry in family economic development is very large; especially for labor absorption, and income generating. Therefore it needs to be developed in order to improve their income and welfare especially for fishing communities (Bapeda Kendal 2017). There are 4 important aspects to improve business scale smoked home industry: (1) capital assistance; (2) innovation; (3) marketing; network expansion; (4) facilitiy and infrastructures development (Angraeni, F.D., I. Hardjanto, and A. Hidayat 2015) while Ilyas, and M. Rakib 2017 add two other important thing promotion and market penetration. According to Campbell (2017) there are five critical steps to scaling the business, namely: (1) evaluate and plan. Take a hard look inside the business to see if it ready for growth, we can’t know what to do differently unless you take stock of where your business stands today, (2) find the money. Scaling a business doesn’t come free. Business actors need the money for hiring staff, deploying new technology, adding equipment and facilities, and creating reporting systems to measure and manage results. How the business actors find the money to invest for growth? (3) secure the sales, scaling the business obviously assumes business actors will sell more, do they have the sales structure in place to generate more sales, and also they must have: a sufficient lead flow to generate the desired number of leads, Marketing systems to track and manage leads, enough sales representatives to follow up and close leads and a robust system to manage sales orders (4) invest in technology. Technology makes it easier and less expensive to scale a business. Business actors can gain huge economies of scale and more throughput, with less labor, if they invest wisely in technology, and (5) find staff or strategically outsource, business actors must have enough customer service staff to carry out the complex work.

3. Methods

This is an expert-based study which is combined with field study, the purpose is to identify important and certainty aspects; and determine the most appropriate strategy
to scale up the business of home industry according to objective conditions directly. Data collection through experts discussion including (1) Policy makers/regional government; (2) academics, (3) home industry experts; and (4) business people; each group of experts represented by two person except policy makers/regional government three persons. Expert discussions were held to obtain expert opinions on the development of home industries, especially smoked fish, and increasing added value and scale of business, as well as the right strategy to increase business actors' income. For complementing the expert's opinion, a field survey was also conducted of business actors in Wcleri and Cepiring districts as smoked fish home industry sentra, guided by Bappeda Kendal.

Data analysis uses SAST (Strategic Assumption Surfacing and Testing) and AHP (Analytical Hierarchy Process). SAST is very helpful for identifying critical assumptions that underlie the model, plan or strategy, as well as explaining the stages in formulating assumptions which forms the basis of policy implementation. The results of the SAST analysis is the alternative assumptions based on the level of importance and certainty using an assumption ranking technique that involves several experts. In this study, SAST was used to identify what is the most important strategic assumptions and certainty should be given attention to scale up the business of smoked fish home industry. While AHP method used to select the best strategy for increasing business scale according to objective conditions. The AHP principle is simplification of complex problems that are not structured, strategic, and dynamic into regular parts in a hierarchy. The level of importance of each variable is assigned a numerical value, subjectively by experts regarding the importance of the variable and relative to other variables. From these various considerations, a synthesis is then carried out to determine which variable has the highest priority and affects the whole system (Marimin 2008; Marimin and N. Maghfiroh 2010)

4. Result and Discussion

Although smoked fish home industry has become the livelihood of most people in Kendal, the government still has not paid enough attention. This is as stated by most of the smoked fish industry business respondents, to get the raw material it has to go through middlemen who get it from fish-producing areas such as Pekalongan and Demak, so the
price is rather expensive. In addition, the production process is still carried out with very simple technology, limited marketing access and very minimal facilities, which are integrated with household activities.

The availability of raw materials still depends on the condition of the surrounding area. There is no local government policy to guarantee the sustainability of raw materials through the collaboration of G to G; supply chain of raw materials (fresh fish) is done by business people themselves from Demak, and Pekalongan regency with out government's role (as shown in figure 1)

![Figure 1. Raw materials supply chain](image)

The production system is very simple, all of, and facilities are also very limited. The results of field analysis showed that 93% of fish smoke home industries in Kendal are beginners, 5% are developing and the remaining 2% developed. with the following characteristics as follow:

Tabel 1. Characteristics of smoked fish home industry in Kendal regency

<table>
<thead>
<tr>
<th>Factor and Benchmark</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Home industry</td>
</tr>
<tr>
<td></td>
<td>Beginner/Startup</td>
</tr>
<tr>
<td></td>
<td>Home industry</td>
</tr>
<tr>
<td></td>
<td>Developing</td>
</tr>
<tr>
<td></td>
<td>Home industry</td>
</tr>
<tr>
<td></td>
<td>Developed</td>
</tr>
</tbody>
</table>

A. HUMAN RESOURCES FACTORS

1. Entrepreneur/Manager | F(1-2), F(2-5), Male | F (3-5),
<table>
<thead>
<tr>
<th>Factor and Benchmark</th>
<th>Parameter</th>
<th>Home industry Beginner/Startup</th>
<th>Home industry Developing</th>
<th>Home industry Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
<td>M(0)</td>
<td>(0)</td>
<td>M (1)</td>
<td></td>
</tr>
<tr>
<td>2. Part Time Worker</td>
<td>F(0-2), M(0-2)</td>
<td>F(2-5), M(2-5)</td>
<td>F(5-10), M(5-10)</td>
<td></td>
</tr>
<tr>
<td>3. Full Time Worker</td>
<td>F(1), M(0)</td>
<td>F(1-5), M(0-3)</td>
<td>F(3-10), M(3-5)</td>
<td></td>
</tr>
<tr>
<td><strong>B. CAPITAL FACTORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Own capital</td>
<td>Plenty (80-100%)</td>
<td>Some (0-40%)</td>
<td>Few (0-10%)</td>
<td></td>
</tr>
<tr>
<td>2. Loans from relatives/colleagues</td>
<td>Some (0-20%)</td>
<td>Some (0-40%)</td>
<td>Few (30-80%)</td>
<td></td>
</tr>
<tr>
<td>3. Revolving fund/and State/Local Budget Reinforcement</td>
<td>None</td>
<td>Plenty (20-60%)</td>
<td>Few (0-30%)</td>
<td></td>
</tr>
<tr>
<td>4. Cheap Credit</td>
<td>None</td>
<td>Few (0-20%)</td>
<td>Some (20-60%)</td>
<td></td>
</tr>
<tr>
<td>5. Banking Credit</td>
<td>None</td>
<td>None</td>
<td>Plenty (40-80%)</td>
<td></td>
</tr>
<tr>
<td><strong>C. PRODUCTION FACTORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technology Application</td>
<td>Very Simple</td>
<td>simple</td>
<td>Modern</td>
<td></td>
</tr>
<tr>
<td>2. Implementation of GMP</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>3. Raw Material Provision</td>
<td>Irregular</td>
<td>Regular</td>
<td>Stock</td>
<td></td>
</tr>
<tr>
<td>4. Process Management</td>
<td>Unstructured</td>
<td>Semi</td>
<td>Structured</td>
<td></td>
</tr>
<tr>
<td><strong>D. BUSINESS FACTORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Raw Material Market</td>
<td>Unpredictable</td>
<td>Fluctuating</td>
<td>Predictable</td>
<td></td>
</tr>
<tr>
<td>2. Production Cost</td>
<td>Uncounted</td>
<td>Recorded</td>
<td>Recording and Counted</td>
<td></td>
</tr>
<tr>
<td>3. Selling Price</td>
<td>Unpredictable</td>
<td>Fluctuating</td>
<td>Periodic Certainty</td>
<td></td>
</tr>
</tbody>
</table>
Table above shows that beginner groups are dominated by women, but there is an interesting thing the higher level of groups the smaller of women role. This mean that women’s behavior and role is very crucial in the beginner group of smoked fish home industry, so this result in line with Nobari, K. Mohamadkhani, A. M., Davoudi 2014, and Husain, Li Xiao Xiao 2016.

Women domination as a business actors in the smoked fish home industry showed that for the low class people women’s role are very significant for their family economic development. This results is inaccordance with women’s involvement in family enterprise (Aderson 2018). An interesting finding from this research is the ownership of capital which shows the higher of business scale the smaller of capital. This showed by developed groups, most of them use bank credit facilities. While in the beginner and developing groups all of their capital is owned by themselves, and has not yet utilized commercial loans from banks.

The most important indicator of the table above is minimum feasibility, there is only break even for the beginner groups, with an income of 1.5-2 million per month that is only enough to survive. Based on this reality, a strategy is needed to develop this home industry through gender-responsive policies according to the objective condition.

Smoked fish home industry in Kendal has developed in several locations, especially in Weleri and Cepiring districts. They develop from generation to generation from their parents without any special education and training. They start businesses with their own capital obtained from selling the goods they own. Generally the smoked fish production process is as shown in the following figure:
Raw materials are delivered from other regions through collectors in the market or through agents, who come directly to the fish production center. Business actors will get the raw materials needed through debt system, and it will be paid fully after the products are sold. This system will put business actors in a weak bargaining position with the middlemen, because only a price reciever. Smoked fish home industry entrepreneurs buy fish raw materials from collectors around 02.00 - 03.00 WIB. Fish is packed in plastic and put in a cardboard box as a secondary packaging. The fish that have been purchased are not processed immediately because they have to wait for the smoked fish produced the previous day to be sold to the market. Because the sale of the produce is done directly by the owner, the production process stops when they sell smoked fish to the market.

From the three groups of smoked fish home industry (beginner, developing and developed), it is known that before processing fish raw material is stored in a cool box equipped with ice cubes to maintain storage temperature. However, the storage temperature cannot be maintained <4°C, to avoid damage of fish raw materials. Most of beginner entrepreneurs process 10-15 kg of smoked fish / day; for developing 15-25 kg per day and developed groups 25-40 kg per day.

Washing and weeding aims to clean fish from bacteria or others using the water. But most beginner using water in the bucket, and repeatedly until the water turns brown and then replaced; This condition is done because most business actors of smoked
The fish home industry do not have adequate clean water facilities. The water is obtained from the wells which is built around the house. There is no special waste treatment, so the waste disposed directly into the river that flows beside their house. Theoretically salting is done on fish that has been cleaned for 30-60 minutes using a salt solution with a saturation level of 70-80%, so the protein coagulates in the fish meat and making the texture of the fish denser or more attractive. But they do it directly by sprinkling crystal salt without size, besides that it's also done in an unclean place so allowing cross contamination. This is done because they do not have knowledge of hygiene and sanitation as well as limited facilities.

Smoking is a method of preservation effected by the combination of drying, deposition of naturally produced chemicals resulting from thermal breakdown of wood and salting. The survey results showed that the fish smoking process was carried out in 3-5 hours, using the results of burning coconut shells and corn cobs. The smoking furnace used is a traditional furnace and it is not equipped with a smoking temperature controller, thus allowing inconsistencies in the temperature used. This condition will allow non-standard product quality. In addition, very high heat also forms polynuclear aromatic hydrocarbons (PAHs) which are carcinogenic and harmful to human health. The problem arises from burning wood and others for smoking fish is air pollution, due to smoke released directly into the air. In the long term without technological intervention from the government, it can increase the ambient air temperature.

The final process of smoking fish is cooling and packaging. After completing the smoking process, the product is stored in a clean room and allowed to reach room temperature for further packaging process. Field observation results showed that the cooling process to reach room temperature is carried out on the floor by stacking it and leaving it open for approximately 12 hours. There is no pest or insect control, so this will allow contamination from exposed environments or insects and pests to products which ready for sale. The final process of smoking fish is packaging. After the product has finished cooling before selling it, the packaging is carried out.

The packaging process is done in a very simple way, using only woven bamboo and wrapped in newspaper. This type of newspaper packaging still
contains Pb which is very dangerous for health, because the Pb will be dissolved by heat and will migrate into the smoked fish, so that consumers will eat it too.

All of smoking processes are done traditionally by female workers (hand-made), while male workers are in charged for just transportation and smoking the fish that requires strong energy. Marketing system is carried out manually by driving a motorcycle around the village, by the entrepreneurs themselves, or through collectors in the market who will sell the products to consumer. Procurement and marketing system of raw material and product which controlled by middleman causing the business to be trapped in unfavorable situations. Greater profit margins are enjoyed by collectors and middleman while the business actors are only small part. The supply chain of product distribution is explained below:

![Supply chain of raw materials and products distribution](image)

Figure 3. Supply chain of raw materials and products distribution

Most business actors, especially beginners, sell their products to consumers through collectors. meanwhile, only a small proportion of them sell directly to consumers, by bringing their products on motorbikes to several villages. For developing and developed groups the products are usually sold directly to the market through retailers. There is a special relationship between collectors and business actors, usually collectors lend money
to business actors, and it is paid through their products. They do this way due to the capital problem, while they cannot access to banks because they have no legality. This pattern of relationship makes business actors have no other choice but to sell their produce to the collector at a price set by the collector.

Based on the survey results above, generally there are several main problems faced by smoked fish home industry players, as well as the efforts that need to be made as shown in the following table:

Table 2. The Support Required for smoked fish home industry

<table>
<thead>
<tr>
<th>Note</th>
<th>Transformation of Beinner Smoked fish Home Industry (H1) to Developing (H2)</th>
<th>Transformation of Developing (H2 to Developed (H3))</th>
<th>Transformation of Developed (H3) to SME (H4) (Small medium enterprise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Required Support</td>
<td>1. Product packaging (Technique, design, material)</td>
<td>1. Soft Loan Capital from Banks</td>
</tr>
<tr>
<td></td>
<td>3. Training /consultation from Local Government/ Regional Work Units</td>
<td>3. The role of local governments in promotion</td>
<td>3. Product packaging (design)</td>
</tr>
<tr>
<td></td>
<td>(Management, business, Character development, Entrepreneurship)</td>
<td>4. Technological Process (Improving quality and</td>
<td>4. Production diversification</td>
</tr>
<tr>
<td></td>
<td>4. Sanitation and cleanliness of business environment</td>
<td></td>
<td>5. Promotion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Improving the quality of Human Resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Business legality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>added values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Cooperation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and collaboration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(clean water and waste management)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the developed groups, product diversification and business legality are needed, because they need for capital support from the banks to increase their business and other transactions.

Based on experts discussion, there are 5 aspects that must be considered to increase the scale of business of smoked fish home industry, namely: government policy (A), market (B); manpower skill (C); capital (D); raw material (E), and infrastructure (F). The result of the SAST analysis shows that availability of raw materials (E) is the most important factor and must be guaranteed. Next followed by the government’s policy support (A), and market (B) as explained in the following figure:
Figure 4. The strategic assumption for increasing the scale of home-based smoked fish industry

Description: - VI: very important; VUI: very unimportant
- VC: very certainty; VUC: very uncertainty

This mean that government’s role for ensuring sustainability of raw material and support marketing is a very important policy to develop smoked fish home industry. To ensure the availability of raw materials, local governments need to collaborate with Pekalongan and Demak as fish producers; and to help marketing of the products it is necessary to build a smoked fish culinary market center on the roadside.

The results of the experts’ discussion showed that there were 8 actors who played a role in developing the smoked fish home industry in Kendal: (1) business actors, (2) RPRC (Regional People Representative Council); (3) CEA (Center of Empowerment Agency); (4) ROSME (Regional Office of Small Business Enterprises); (5) RPA (Regional Development Planning Agency), (6) ROM (Regional Office of Marine); (7) RWE (Regional Women Empowerment) and (8) ROT (Regional Office of Trade). There are 6 important factors: (1) sustainability, (2) revenue, (3) manpower, (4) marketing, (5) policy, and (6) raw material; 4 important programs: (1) training of production, management and marketing, (2) technological strengthening, (3) networking and marketing; and (4) promotion; while for the strategy there are 4 suitable choices according to the existing objective conditions. AHP analysis results to obtain priority strategies based on the results of expert discussions as shown in Figure 5.
Figure 5. The hierarchical structure to scale up the business of smoked fish home industry

Figure 5 also shows that RPRC is the second actor who has a big role in the development of smoked fish home industry, due to its role that endorses regional development plans and as a public policy maker (Ana 2014). The RPRC also has a supervisory function on the developments carried out by the executives (Wibowo et al. 2016). However, the business actors are really the ones who will determines the success of scale up the business. So, willingness, discipline and the spirit of business are the key success factors for scale up the business of smoked home industry.

There are 3 priority factors for increasing the scale of business of the fish smoking home industry, including guaranteed raw material availability (0.358), sustainability of business activities (0.300) and manpower (0.113). The guaranteed raw materials availability is the main factor, because without certainty of raw materials the sustainability of smoked fish home industry activities will not guaranteed. Although most business actors, especially for the beginner group, that economically the smoked fish industry is less profitable because net income is only IDR 1-1.5 million per month, but there is no
other choice can be done. And this activity also can be a social safety net because it can absorb a large enough workforce.

AHP analysis results (Figure 5) also shows that network and marketing development (0.475), and than process technology strengthening (0.275) are the two. Marketing access is still limited for home industries (Kholil, N.B. Sukamdani, and Nunung 2016). Therefore market expansion is a very strategic program. Overly simple production system with very limited facilities also hinders the increase in production. Therefore technology support in the production process is very important, so an assistance program to implement technological process becomes very necessary.

Based on the relationship among actors, the factors and priority programs described above, the most priority strategy to scale up the smoked fish home industry is product diversification (0.334), and than construction of home industry centers (0.312). The product diversification strategy will drive the number of production to increase, therefore encouraging an increase in turnover and income of home industry entrepreneurs. While the construction of home industry centers equipped with clean water and sewage treatment will improve the quality and cleanliness of the production process. This will also make it easier for local governments to empower, monitor and control them.

Product diversification is the best strategy for scale up the business of smoked fish home industry, through this strategy business actors will able to increase their productivity, and so do their income. The results of AHP analysis based on expert discussions confirm the results of the field survey, that product diversification especially for developed groups is needed. Because this group has a wider marketing reach, and has entered to the modern market, and has a much larger share of the market segment. Thus more product variations are needed to meet consumer desires. The results of interviews with business actors also show that product diversification is also needed for the beginner and developing groups to increase their production, turnover and income.

5. Conclusion and recommendation

Smoked fish home industry in Kendal regency is still facing several fundamental problems, namely: capital, facilities, raw materials, technological process, waste treatment and market access. Regional development planning agency (RPA) is the
institution that has the highest role to scale up the business of smoked home industri in Kendal regency. Government’s role for ensuring sustainability of raw material, and market accesses is the key success factor of business sustainability. To scale up the business of smoked home industry in accordance with objective conditions, product diversification is the most suitable strategy.

6. Acknowledgement
The author expresses his gratitude to everyone who have helped this study, especially to the Ministry of Research of Higher Education for funding support for research activities. Thanks also to the Kendal Regency Government for giving the permission for the research, and all experts and business people who have contributed inputs in the research activities.

7. Practical Implication
The main problem faced by the government to scale up smoked fish home industry business in Kendal regency is to set strategic priorities according to objective conditions. The results of this study showed that product diversification is the most appropriate strategy and networking and marketing expansion is the most suitable program. Therefore these results will be very useful for local governments to develop business scale of smoked fish home industry.

8. Theoretical Implication
The most appropriate strategy to scale up smoked fish home industry have been identified by AHP analysis, where AHP is one of Soft System Methodology (SSM) which is expert based. Therefore expert research is one method which can be a more practical choice than sampling-based which requires many examples, more energy, more time and funds. While in experts based research 3 to 5 experts is enough. But the problem is how to select the right experts.

9. Limitation of this research
This research still cannot reveal how to improve the taste quality of smoked fish produced and how to speed up the fish burning process which currently takes 6-7 hours, especially for the beginner group. By accelerating the fish burning process productivity can be increased, thereby increasing its income. Therefore more advanced research is needed to focus on efforts to improve the quality and acceleration of the production process.

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SMOKED FISH HOME INDUSTRY

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