II. LITERATURE REVIEW

2.1 Pulp and Paper

2.1.1 Definition of Pulp and Paper

Pulp is a mixture of cellulose material, such as wood, paper, and rags, ground up and moistened to make paper, while paper (papier) is a human creation of goods originating from forest commodities, which are very important in life. Wood pulp is the most common raw material in papermaking. The timber resources used to make wood pulp are referred to as pulpwood. Wood pulp comes from softwood trees such as spruce, pine, fir, larch and hemlock, and hardwoods such as eucalyptus, aspen and birch (Wikipedia, 2012). Paper is a thin material that mainly used for writing upon, printing upon, drawing or for packaging. Pressing together moist fibers and cellulose pulp derived from typically wood, rags or grasses, then drying them into flexible sheet produce it.

Paper is a versatile material with many uses. Whilst the most common is for writing and printing upon, it is also widely used as a packaging material, in many cleaning products, in number of industrial and construction processes, and even as a food ingredient particularly in Asian cultures. Thus, paper is unseparable and very important for human cultures and daily activities across their lives.

2.1.2 History of Pulp and Paper

The first fairly recent innovation is using wood to make paper. In the 1800s, fibre crops such as linen fibres were the primary material source, and paper was a relatively expensive commodity. The use of wood to make pulp for paper began
with the development of mechanical pulping in Germany by F.G. Keller in the 1840s, and by the Canadian inventor Charles Fenerty in Nova Scotia. Almost a decade later the first commercial sulfite pulp mill was built in Sweden. It used magnesium as the counter ion and was based on work by Carl Daniel Ekman. By 1900, sulfite pulping had become the dominant means of producing wood pulp, surpassing mechanical pulping methods.

The oldest known archaeological fragments of the immediate precursor to modern paper date to second century BC China. Papermaking is considered one of the Four Great Inventions of China, and the pulp papermaking process is ascribed to Cai Lun, a second century AD Han court eunuch. Paper spread from China through the Islamic world to medieval Europe in the 13th century, where the first water-powered paper mills were built. In the 19th century, industrial manufacture greatly lowered its cost, enabling mass exchange of information and contributing to significant cultural shifts. In 1844, Canadian inventor Charles Fenerty and German F.G. Keller independently developed processes for pulping wood fibers.

The word "paper" is etymologically taken from Latin papyrus, which comes from the Greek (papuros), the word for the Cyperus papyrus plant. Papyrus is a thick, paper-like material produced from the pith of the Cyperus papyrus plant which was used in ancient Egypt and other Mediterranean cultures for writing before the introduction of paper into the Middle East and Europe. Although paper is etymologically derived from papyrus, these two things are actually produced very differently and the development of modern paper is separate from the development of papyrus. Papyrus is a lamination of natural plants, while paper is
manufactured from fibres whose properties have been changed by maceration or disintegration.

2.2 **Pulp and Paper Industry**

Industry can be broadly defined as any efforts and activities that are productive in the economic field, while the narrow processing industry including the paper industry is an activity that changes the basic stuff mechanically, chemically, or manually creating goods that are ready for immediate consumption and intermediate goods which can be used as input for further processing.

The pulp and paper industry comprises companies that use wood as raw material and produce pulp, paper, board and other cellulose-based products. The industry is dominated by North American (United States and Canada), northern European (Finland, Sweden, and North-West Russia) and East Asian countries (such as China, Japan, and South Korea). Australasia and Brazil also have significant pulp and paper enterprises. The trend is expand globally to countries like Russia, China and Indonesia with low wages and low environmental oversight. Pulp and paper industry needs a huge capital because the industry is capital oriented. Ministry of Industry and the Indonesian Pulp and Paper Association (APKI) classified pulp and paper industry into (Paper Industry Roadmap, 2009):

The scope of pulp industry as follows:

a) Based on the length of fiber is divided into: needle bleached kraft pulp and leaf bleached kraft pulp.
b) Based on the manufacturing process is distinguished by: chemical pulp and mechanical pulp.

c) Based on raw materials divided into: wood pulp and non-wood pulp.

d) Also divided into: virgin pulp (pristine pulp obtained from the processing of wood or non-wood into pulp either by chemical or mechanical processes) and recycled pulp from waste paper.

The scope of paper industry as follows:

a) Paper Culture, consists of newsprint; printing and writing paper valuable paper (paper stock, paper, stamps, etc.).

b) Paper Industry, consist of sack kraft, kraft liner, Corrugating medium, board, and paper wrappers.

c) Tissue Paper, consist of household tissue paper and paper cigarrate.

d) Specialty Paper, consist of paper money; decor paper; paper overlay; thermo paper; label paper, and etc.

In production, the past used raw materials, which mostly comes from virgin pulp sourcing from wood raw material. Along with the decline in timber stock, and the raises of global awareness on environmental issues, the usage of waste paper as raw material for paper industry (recycling) is growing rapidly. The use of recycled paper can also save the company’s production cost. The need for waste paper for the national paper industry currently reach 6 million tons per year, whereas 3 million tons of waste paper collection is domestically supplied and the rest is obtained from import. The uses of waste paper raw materials will increase along with international pressure on the
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evironment issues. Development of wood raw material can be carried out by
countries that still have considerable potential in countries like Indonesia.

2.2.1 Vertical Integration on Pulp and Paper Industry

Vertical integration is the incorporation of companies that have a continuing
process of production (Hasibuhan, 1994). Integration is classified into the
integration of upstream and downstream integration. Companies that apply to the
upstream vertical integration strategy is the company that produces its own inputs,
whereas if the company decides to distribute the output to consumers through an
integrated organisation, that company shall perform downstream vertical
integration. Vertical integration can be done in two ways (Ministry of Industry,
2009):

1. Full Integration

Full integration occurs when firms produce all the needed input or when the
company is distributing all output generated by subsidiaries integrated with
it.

2. Taper Integration

Taper Integration occurs when firms purchase resources that are needed for
production from other companies or distribute the products through an
integrated company within its organization body as well as companies that
are not integrated.

According Karseno and Mulyaningsih, in Ramli 2006, vertical integration
by pulp and paper companies will increase the efficiency of companies in the
industry because it can secure supplies of raw materials and minimize transaction
costs in anticipation of growing demand for paper products. The integration of pulp and paper industries can be seen in figure 2.1 (APKI, 2009).

Ministry of Industry and Indonesian Pulp and Paper Association (APKI) grouping of vertical integration in the paper industry as follows:

Core industry: Paper Industry

Supporting industry (upstream industry): Manufacture of pulp, which consist of virgin pulp and recovered paper industry. There are two types of virgin pulp such as, Leaf and Needle Bleach, Kraft Pulp Bleach, and Kraft Pulp. Paper as intermediate products, such as liner and medium paper Kraft Liner, which is an industrial raw material packaging Cardboard Box Wave.

Industry-related (Downstream): Photocopy paper industry, packaging industry box, the printing and graphics industry and converting industries (Such as book industry, household tissue, etc.).

Most of the paper companies have their own integration of downstream integration to minimize the cost of production, for example PT. Indah Kiat Pulp and Paper and PT. Riau Andalan Pulp and Paper, which have their own pulp mills for the input of their paper production.
2.3 Theoretical Review

2.3.1 Industrial Theory

Dumairy (1996) explained that there are two definitions of industry in the economics sense. First, the industry is the set of the company-its peers, for example the paper industry is a group of companies producing paper. Second, the industry is the economic sector whereas there are productive activities in processing raw materials into finished or semi-finished goods. In the second sense, the industry is more often called as processing or manufacturing industry. According to Dumairy’s theory, the pulp and paper industry is an activity or business to process basic goods or raw materials of pulp and paper that have added value for society by the companies. Industrial development is a major nation’s objective to create a strong and balanced economy system, which is supported by agriculture sector.

Industrialization is the process of economic modernization covering all economics sectors that have a relationship with one another. Industrialization aims to increase value-added to the sectors of the economy. Industrialization is the crucial condition for sustaining long-term process of economic development with a high rate and sustainable economic growth. The process of industrialization can be defined as the process of changing the economic structure, which there are increased in the industrial sector's contribution to consumer demand, GDP, exports and employment (Chenery, 1986).
According to Badan Pusat Statistik (BPS), 2011, industry can be divided into four types:

a) Major Industries, are industries that use machine labor force with upwards of 50 people or industries that do not use the engine power but has a workforce of 100 people over.

Medium Scale Industries, are industries that use the labor force by as much as 5 to 49 people or industries that do not use the machine but it has a labor force of 10 to 99 people.

Small Scale Industries, are industries that use machine labor force by as much as 1 to 4 people or industries that do not use the machine but it has a labor force of 1 to 9 people.

Household Industries or Micro Scale Industries, are the industries doing the processing of an item that has a value-added goods, but that industry has a workforce that is not to be paid.

2.3.2 Concept of Regional Development

Trickle down effect strategy used in the new order development assumes the need to prioritize economic growth first, and then do equity. This theory assumes that the level of living will increase with the economic growth achieved through accelerated growth and the industry in growth centers (center) which then will have an impact on surrounding areas (edges or peripheral) so that the industrialization and development of the central area into a major destination. In fact, in many countries, including in Indonesia, this theory failed to create prosperity for the whole society, especially rural communities. The use of natural
resources and human resources in the countryside will provide benefits to the central region and creating poverty for suburbs. This situation requires a shift in paradigm towards growth that makes people becoming human centered development as a primary goal of development through the contribution of each people participation in the improvement of the economy.

Regional development that concerns to the community development is shown in the income improvement, decrease of the jobless productive age, as well as regional physical development facilities of the region. Uses of human resources and potention of the region shall be developed efficient and effectively. Efficiency is shown in the natural resources exploration that is fit with the precise uses and also the sustainability efforts to retain it for the long term use. The objectives of the development should be reach effectively whereas region would be able to develop itself becoming the established region. The purpose of regional development is to improve living standards, advances the public mindset and self-reliance of local economies. The local community living standards can be measure quantitatively by specific indicators, such as the income of the community, employment (unemployment), food consumption, and cleanliness.

The Law No. 25 of 2004 provide formal legitimacy of regional autonomy to local governments as an instrument for institutionalizing participatory planning in development, as well as the obligation to promote and develop the competitiveness of regional or local economic competitiveness according to Law No. 32 of 2004. Enhanced regional competitiveness through improving the local economy by pursuing the creation of or increase in value-added areas that can be implemented through the principle of all stakeholder both public and private
sectors, linkage between sectors who want to be developed, and local resources including natural resources, human resources, as well as other potential resources.

2.4 Input Output (I-O) Table

Input-Output Table was first introduced by W. Leontif, in 1930s. Input-Output quantitative model can provides overall preview of the interdependencies between sectors within a region. Based on the Input-Output Model, the influence of economic interactions can be classified into three types includes: direct effects, indirect effects, and the total effect.

Influence of certain sector description to other sectors development activities in order to enhance the regional economic is only explainable using the Input-Output Model, thus through Input-Output Model, it would be clearly shown which sector that can be the key sector in the regional development (Daryanto, 1993):

1. A sector is considered as a key sector if the backward linkage and the forward linkage are relatively high.

2. A sector is considered as a key sector if it can produce a relatively high gross output, which also shows relatively high demand.

3. A sector seen as key sectors if it is able to produce net revenue is relatively high.

4. A sector seen as key sectors if it is able to create high jobs (employment).

Through the four conditions and the development of key sectors through the existing data, it can be seen whether or not pulp and paper industry could be one key sectors in the economy of Riau Province.
Advantages to be gained when using the Input-Output Table:

1. Detailed description of the national economy and regional economies with interdependences among sectors and quantify sources of exports and imports can be provided through the Input-Output Table.

Final demand can be determined by the size of the output of each sector and the need for production factors and resources.

The detail in the impact in demand on the economy caused by both public and private of changes can be track and.

Technology and relative prices changes can be integrated into the model through changes in technical coefficients.

Data are presented in Input-Output Table have detailed information about the input and output capable of describing the sectorial linkages between sectors of an economic activity. Input-Output Table is static and closed, in which households are considered as endogenous or households to determine consumption inside of the existing economic system. The basic assumptions in Input-Output Table are:

1. Homogeneity, namely the assumption that every economic sector produces only one type of goods or services with a single input arrangement and there is no automatic substitution at the input and output of other sectors.

Proportionality, assuming that the relation of input and output of each sector is linear, then any increase and decrease the output of a sector is proportional to the increase and decrease in input use.

Additively, assuming that the total effect and production activities in various sectors of the sum effect of each activity
2.4.1 Limitations of Input-Output Table

Input-Output Table also has its limitations where the coefficients input or technical coefficients assumed to be fixed (constant) during the period of analysis. Then the technology used in the production process is also assumed to be constant so that changes in quantity and input prices will always be proportional to the quantity and price changes in output prices. The more aggregated grouping made the existing sectors will lead to violations of the assumption of homogeneity of the trend higher. Then this will create a lot of detailed economic information is not revealed in the analysis.

2.4.2 Input-Output Table Structure

Input-Output Table provides information about goods and services transactions that occur between the production sectors in an economy with a matrix form of presentation. In addition to transactions between sectors, Input-Output Tables record the balance of consumption, payment of labor services and capital owners in the line of value-added, and import transactions.

From the Table 2.1 it shows that there are three matrixes (Z, Y, and V). These matrixes can be calculated to result the output structure, demand structure, gross value added, export and import of regional economy. The calculated of the table also produce value of linkages; dispersion and multiplier to define what sector in the production sector that gives the highest contribution, or defined as a key sector of the economy.
Table 2.1 Input-Output Table Simplification

<table>
<thead>
<tr>
<th>Source: Daryanto, 2010</th>
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To understand the table, it takes basic notions are used, namely:

**Output**

In Table IO, calculations on the basis of producer prices used in the output to avoid double calculations, because consumer prices are on the margin trading and transportation costs that should go into the trade and transport sectors.

**Intermediate Input**

Intermediate input consist items that are usually finished in the input of single-use, such as raw materials. In Table Input-Output, intermediate input is Zij, which is described by the production sector j to produce the required input from sector i as Zij.

**Primary Input**

In the Input-Output Table, the primary input reflected by wages and salaries, business surplus, indirect taxes and subsidies.

**Final Demand**

Includes household consumption expenditure, government consumption expenditure, fixed capital formation, stock change, exports and imports.
5. Export and import

In the Input-Output Table, export and import is transactions of the goods and services between residents of an area with a population outside the region, both other provinces and abroad.

Simplification of the Input-Output tables can be created in the form of general equation (1) as follows.

\[ \sum_{j=1}^{n} Z_{ij} + Y_i = X_i \quad \text{for } i = 1, 2, 3, \ldots \ldots \ldots \ldots \ldots (2.1) \]

On the table there are three basic matrix Z the matrix, the matrix Y, and the matrix V. Matrix Z is a matrix of transactions between the input; matrix Y is a matrix of final demand consists of demand for household consumption (C), government (G), investment (I), and exports (X); matrix V describes the primary input consisting of wages (W), business surplus (S), depreciation (D), and subsidies (T). There are two equations in the balance sheet as follows:

**Row:**

\[ \sum_{j=1}^{n} Z_{ij} + Y_i = X_i \quad \forall i = 1, 2, \ldots, n \quad \ldots \ldots (2.2) \]

**Column:**

\[ \sum_{j=1}^{n} X_{ij} + V_j + m_j = X_j \quad \forall j = 1, \ldots, n \quad \ldots \ldots (2.3) \]

Definition of balance is the balance sheet at the time of production (output) equal to the number of inputs (input). In the equation, \( X_{ij} \) is the value of the flow of goods or services from sector i to sector j; \( Y_i \) is the total final demand; \( V_j \) and \( m_j \) is the value added and imports. Flow between industries can be transformed into a coefficients by assuming the purchase amount is fixed for each level of output (no force of the principle of economies of scale), and do not include the
possibility of substitution between raw materials, in other words, the input is assumed to be fixed. Flow coefficients of this industry are:

$$\alpha_{ij} = \frac{X_{ij}}{X_j} \quad \dot{\ldots} \quad \dot{\ldots} \quad (2.4), \text{ or}$$

$$X_{ij} + \alpha_{ij}X_j \quad \dot{\ldots} \quad (2.5)$$

By inserting equation (5) into equation (2) obtained:

$$\sum_{j=1}^{n} \alpha_{ij}X_j + Y_i = X_i, \quad \forall i = 1, \ldots, n \quad \dot{\ldots} \quad (2.6)$$

In matrix notation equation (6) can be written as follows:

$$AX + Y = X \quad \dot{\ldots} \quad (2.7)$$

Where $\alpha_{ij} \in A_{nxn}; Y_i \in Y_{nx1}; X_i \in X_{nx1}$

By manipulating equation (2.7), the basic relationship of the IO table can be determined that:

$$(I-A)^{-1} Y = X \quad \dot{\ldots} \quad (2.8)$$

Whereas $(I - A)^{-1}$ named as Leontief inverse matrix. This matrix contains information about how to increase the production of an industrial sector will lead to the development of other industrial sectors. Leontief inverse matrix describing the full impact of changes in production (output) of an industrial sector to the total production of other sectors into coefficient sector- the coefficient is called the multiplier output. Multiplier is numbers that is visible from the inverse matrix Leontief. Input-Output analysis form the basis of economic analysis on the state of the economy. In general, the matrix in the Input-Output Table is divided into four quadrants, the quadrant I, II, III, and IV.
a) Quadran I (Intermediate Quadran)

Every cell in quadrant I show a transaction between the goods and services used in the production process. The quadrant shows visible linkages between economic sectors in the production process.

Quadran II (Final Demand Quadran)

Shows the sales of goods and services produced by sectors of the economy to meet the final demand (output) is directly used by households, government, fixed capital formation, exports and stock changes.

Quadran III (Primary Input Quadran)

Show purchases generated outside the system of production by sectors in the intermediate quadrant. This quadrant is the quadrant that produces value-added gross domestic product of the region.

Quadran IV (Primary Input- Final Demand Quadran)

Indicating a direct transaction between the primary inputs quadrant with final demand without going through the production system or a quadrant between.

2.4.3 Input-Output Sector Classification

Classification of sectors in the Input-Output table is a framework that determines the initial research stages of subsequent identification. Sector classification aims to classify the economic activity of great diversity to be one - a sector unit as far as possible have the same production process and output are homogenous.
There are two main criteria in classifying economic sectors, namely:

1. Economic activities (Input)

   Grouped according to similarity of structure input, despite having the use of a different output. This also called "horizontal grouping".

2. Activity (Output)

   The economic activities that produce several kinds of goods and services, even though the number of outputs and services are changes can be classified into one sector. This classification occurs in the economic activities are carried out according to the successive stages in the production process. This classification also called "vertical grouping".

Clustering of these sectors will facilitate the analysis of the study, in which sectors of the grouping is done completely and clearly where it includes any activities or commodity in every sector in Riau Province, both concerning the regional production and imports from outside of Riau Province.

2.4.4 Linkage Analysis

   Explain the relationship between industries or sectors. Backward linkage shows linkage to total purchases in the purchase of inputs used for the production process. While the forward linkage shows the relationship of sales to total sales generated output. Direct linkage is shown by the coefficients directly, while the direct and indirect linkages are shown from the Leontief inverse matrix. Leontief inverse matrix is also called the coefficient matrix of the relationship because it contains important information about the structure of the economy to determine the extent of linkages between sectors.
2.4.5 Dispersion Effect Analysis

The dispersion effect analysis is the development from direct backward-forward analysis, by comparing direct and indirect linkage multiplies by number of sector with total direct–indirect linkage values from all sectors. This analysis is the best way to know the dependences between sectors.

1. Coefficient of Dispersion

This analysis is describing the effect caused by some units of end demand for all sectors in one economy. Coefficient of Dispersion also called backward dispersion.

2. Sensitivity of Dispersion

Sensitivity of Dispersion is a description of the effect caused by a unit of final demand for all sectors in the economy. Sensitivity of dispersion is a direct linkage or indirect forward linkage.

2.4.6 Multiplier Effect Analysis

There are two types of multiplier analysis that used in this research:

1. Output Multiplier

Output multiplier calculated in the per unit change in the output of a sector as the initial effect, will be an increase or decrease in the total output of all sectors by one monetary unit.

2. Income Multiplier

Measures the increase in output revenue due to changes in the economy of a region. Income as defined in the input output table is wages and salaries received by the household.
2.4.7 Key Sectors Analysis

Key sectors in the economy will be determined by the ability of a sector in supporting the economy, which can be seen from the linkages analysis, dispersion analysis and the multiplier analysis.

2.5 Previous Research

Several studies have been conducted on the pulp and paper industry using Input-Output (IO). Satrio, 2010, has done a research on the impact of investment in pulp and paper industry on employment and household income of Indonesia. The conclusion to be drawn was that the effect of increasing investment in output that occurs in all sectors of national economy, increase employment opportunities and changes in household income.

Master School of Business and Management, Bogor Agricultural University and Sinarmas Group work together in making its final report entitled “The Role and Contribution of Pulp and Paper PT. Indah Kiat and PT. Arara Abadi Plantation in Socio-Economic Development Areas in Riau”. The study was conducted using input-output analysis Riau 2001 Input-Output data is then done updating the Input-Output data to 2006. Data processing is supported by the program GRIMP (Generation of Regional Impacts) and Microsoft Excel, which is conducted from December 2007 until April 2008. The primary analysis of the results through the questionnaire is known that the average income of people in the Pulp and Paper Industry, especially PT. IKPP is bigger than the people who are outside the industrial area, where it is shown from the results of the analysis that 68 percent of revenues associated with the presence of PT. IKPP. Judging
from the analysis, the welfare of labors is known to increase due to the presence of PT. IKPP and PT. Arara Abadi.

The role of paper industry in Indonesian economy by using Input-Output Table of Indonesia in 2000 domestic transactions on the basis of producer price of the classification of 175 sectors with demand-side model has been done by Ramli, 2006. The results indicate that the output of the paper industry is more widely used for direct consumption (society, government, and export) rather than as input for other sectors. In addition, Sihombing has also carried out Input-Output analysis of the role of industry in the economy of Riau Province in 2004, with a focus on forestry industry, which is also the raw material of pulp and paper industry. Sihombing results indicate that the forestry sector has a high value of forward linkage and ranked seventh for the output, ranking fifth in the employment, ranked sixth in the gross added value, ranking tenth for productivity and ranks twenty-sixth for wages and salaries, and the advice is to the development of the forestry sector in Riau Province that should be considered more carefully to the social costs and the benefits.

Input-Output analysis has also been widely used by other studies outside Riau Province. Puspitawati has done a research with Input-Output analysis on the role of agriculture and manufacturing industries in the economy of East Kalimantan Province with Input-Output analysis, in 2000. From the Input-Output analysis used in the research, it appears that the industrial development in East Kalimantan are relatively only the benefit of input from the agricultural sector and lack of rewards to the sector. Advice given in this study is that the government of East Kalimantan can prioritize manufacturing sector in regional development.
This effort should also be selected through a development strategy based on the potential of the region, which for the East Kalimantan is non-agroindustry sector.

Meanwhile, Wibowo (2009), has also done the research of agro-industry by analyzes the role and impact of the agricultural sector investment to the economy of East Java Province by using Input-Output analysis. The result of the analysis shows that the agricultural sector has backward linkage value lower than the forward linkage. The value of output multiplier and employment multiplier are also low compared to other sectors of the economy. Advice given by the authors in this study is to increase the government role to encourage the provision of agricultural inputs for the sector and make the right investment funds allocated to the crops sub-sector. Research on the role of agro-industry and the impact of the investment on the economy in Ciamis District: Input-Output analysis performed by Noer (2011). The results showed that the contribution of the agro-industry ranks third of the ten sectors. The impact of five-year investment in accordance with the agro-industry sector will increase the total output of Ciamis District for 144,685 billion rupiah. Advice given in this study is the need for special attention from local government to improve the agro-industry products in order to meet the demand for consumption of the communities; government also needs to provide supporting facilities in order to increase incomes.

Besides Noer, in 2011, Permatasari and Kencana are also conducting research with Input-Output analysis. Permatasari (2011) analyzes the impact of the trade sector investment in Indonesia's economy while Kencana (2011) analyzes the role of the tourism sector in the economy of Jakarta Province. The results show that the trade sector has a significant role in several aspects of the
economy and has a value greater backward linkage than forward linkage value. Meanwhile, in Kencana (2011) research, it appears that the tourism sector needs to get priority in its development because it has the highest value for the both multiplier analysis (Output and Income). Thus the government of Jakarta is expected to overcome the constraints caused by lack of budget allocation for tourism sector.

In general, studies on the linkage, dispersion and multiplier have an important role for a region. Study of the literature suggests that Input-Output analysis has been widely used as a research tool. Recent research on the pulp and paper industry using Input-Output Table of Riau Province 2010 has not been done yet.

2.6 Research Framework

Economic growth is the goal of regional and national development, including Riau Province in which social welfare can be increased rapidly through the improvement of one or several key economic sectors. Pulp and paper industry as one of the manufacturing industry is a priority in Riau Province economy that can have an impact on improving the welfare of society in development.

Therefore, this study will discuss the role of pulp and paper industry in Riau Province economy by using Input-Output analysis with the coverage stated in the previous chapter. Assessment of the role of pulp and paper industry can be seen through linkages with other sectors, the ability to pull the upstream and to push the downstream sectors, multiplier effects on total output and total income of all sectors, as well as role in key sectors of the economy that is expected to provide
an overview of development of pulp and paper industry. Framework in this research can be seen in figure 2.2.

Figure 2.2 Research Framework
2.7 Research Hypothesis

Based on the research problems, then the hypothesis of this research are:

1. Pulp and paper industry has high contribution in the economy of Riau Province in term of demand structure, output structure, gross value added, investment and export-imports.

2. Pulp and paper industry has high linkages with other sectors in the economy of Riau Province.

3. Pulp and paper industry has a role in encouraging and exciting growth of upstream and downstream sectors in the economy of Riau Province.

4. Pulp and paper industry has high value of output multiplier and income multiplier income in the economy of Riau Province.

5. Pulp and paper industry is one of the key sectors of the economy of Riau Province.