

## **THE IMPORTANCE OF ADAPTING AND UPDATING THE NEW SUPPLY CHAIN CAPABILITIES FOR SUSTAINABILITY IN THE BUSINESS OF SUPPLY EQUIPMENT IN OIL AND GAS INDUSTRIAL PROJECTS**

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### **Abstract**

The supply of equipment in oil and gas industrial projects requires high standards and specifications due to high requirements of safety and reliability. Delay of equipment delivery is very sensitive as the impact will be direct to the whole project, while the delay of project completion will disrupt PSC's (Partnership Status Contractor's) initial production. Ultimately, this would disrupt the oil and gas production target of the Government of Indonesia. Operational data show that a lot of delay is caused by the ineffectiveness of supply chain management at PT AMN. These conditions increased complaints and penalties from customers while at the same time decreasing the operational efficiency of PT AMN. To overcome this problem and enhance customer satisfaction it is required to evaluate the existing supply chain capabilities and then adapt, update, and develop new supply chain capabilities. Determine new supply chain capabilities of PT AMN, requires analysis data of PT AMN related to customers' needs, internal assessment, existing supply chain, check-list supply chain capabilities, SWOT analysis, five pillars, the landscape of supply chain technology, game changer and risk management analysis for business sustainability. In terms of determining supply chain capabilities, PT AMN is categorized as an Adaptive Initiative or Continuous Improvement Initiative

**Keywords:** oil and gas projects, supply of equipments, supply chain capabilities, business sustainability

### **Introduction**

Investments in the oil and gas industry must be supported by adequate technical design, construction, project management, facilities, services, and procurement of equipment such as centrifugal pumps, gas compressors, and air compressors (Lin, Zhang, & Gu, 2010). The high safety standard in the Oil and Gas Industry requires high standards and specifications of equipment. The regulation for such requirement is included in the working guidance by BP Migas No: 041 / ptk/ i/ 2011 (Patel, Salehi, Ahmed, & Teodoriu, 2019).

One of the companies that provide centrifugal pumps for oil and gas in Indonesia is PT AMN. PT. AMN is a private company which was established in October 1986 (Spiegel, 2012). Its main office is located in Jakarta. Its branch offices are located in Balikpapan - East Kalimantan; Cilacap - Central Java; Balongan - West Java; and Sorong - Papua. PT. AMN is the legal representative – the Exclusive Agent / Distributor of an American Multinational Corporation) for the oil and gas market in Indonesia.

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The key to success in this market is the ability to understand the requirements of end users and the development of optimum product solutions in these industries (Tukker, 2015). Manufacturers that offer their best value-added services will get the most benefits. Furthermore, manufacturers that anticipate and develop innovative solutions and price competition, that uniquely satisfy end-user demands and put an extra effort into building lasting relationships will experience more success in this market (Khan, 2014).

The few improvements of products made by manufacturers mostly focus on the new development of materials for the purpose of improving reliability. The major competitive advantage factors in the market mostly include energy cost savings, value-added services, prompt delivery, brand image, and price. As said earlier, the production of oil and gas in Indonesia has experienced declines partly due to the delays in some of the PSC's initial production ([http:// esdm.go.id/](http://esdm.go.id/)). This delay in delivery is also experienced by PT. AMN.

PT AMN is currently facing the following problems:

1. Frequent delays of goods delivery to customers due to ineffective supply chain at PT. AMN.
2. Increasing complaints and penalties from customers which reduce the company's profit due to the lack of capabilities of the PT. AMN's management to provide accurate information regarding delivery schedule.
3. The inability to perform local packaging disrupts the company's operational efficiency.

The objectives of this study are:

1. To evaluate the effectiveness of existing supply chain capabilities at PT AMN
2. To develop new supply chain capabilities for PT. AMN to minimize complaints and penalties from customers and to enhance customer satisfaction.
3. To give suggestions or recommendations for the company to enhance its operational efficiency.

For the company: This study will provide an evaluation of PT. AMN's current supply chain management and try to develop PT AMN's new supply chain capabilities, so that the delivery delays and penalties will be minimized. Ultimately, customer satisfaction and the company's profit will be improved.

For academic purposes: This case study aims to align the best practices in the industry with academic purposes. The writing of this thesis also aims to contribute to the academic environment by strengthening theory and application to the actual business.

### **Literature Review**

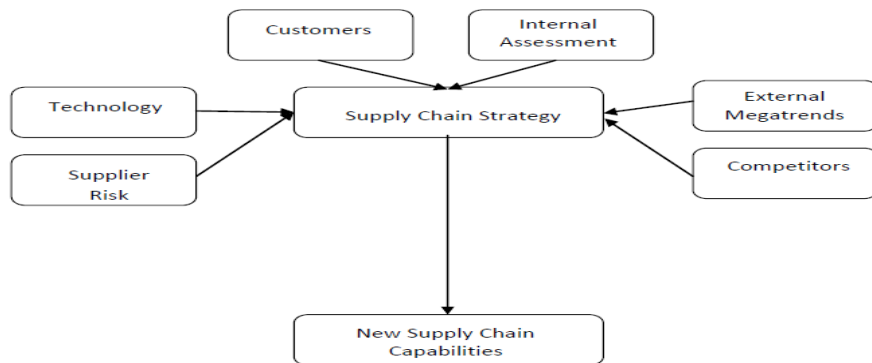
Supply chain management is a total system approach as a strategic coordination in terms of the flow of information, products, and services across the network, from

customers, to the company and to the suppliers (Mello, Gosling, Naim, Strandhagen, & Brett, 2017). A supply chain consists of two or more legally separated organizations, being linked by material, information, and financial flows. These organizations may be firms producing parts, components, and end products, logistic service providers, and even the (ultimate) customer himself, a supply chain also incorporates the ultimate customer (Stadtler, 2014).

(Christopher, 2011) defined supply chain management as “The Management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as the whole.

The Supply Chain Council summarizes the concept of supply chain management (SCM) in just five words: plan, source, make, deliver, and return. This five-word definition has been accepted as the basic description of what a supply chain looks like and what its core functions (Evans, Mason, Zokaei, & Hines, 2007).

The elements of supply chain strategy are required to be identified in order to know the condition of the supply chain in a company (Lambert & Cooper, 2000). As described in Figure 2 below, the elements of supply chain strategy consist of the customer, internal assessment, external megatrends, competitors, technology, and risk. All elements will create a current supply chain strategy. The current / existing supply chain strategy should be evaluated. The analysis of condition could use a Strength-Weakness-Opportunity-Threat (SWOT) Analysis, Five pillar analyses, considering all supply chain megatrends. That analysis will determine the capabilities of the existing supply chain and as a basis for developing new supply chain capabilities in that company.



**Figure 2: Elements of a Supply Chain Strategy**

(Dittmann, 2013)

SWOT analysis is a useful technique for understanding strengths and weaknesses, and also to identify opportunities and open against threats from the outside. Strengths and Weaknesses are often called internal organization factors, while Opportunities and Threats are generally related to external factors. For this reason, SWOT is sometimes also called Internal-External Analysis. A list of questions below can be used as guidance in terms of finding the factors of strength and weakness in the company in taking advantage of opportunities and faced threats (<http://www.mindtools.com>, 2015)

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According to (Dittmann, 2013), five pillars of excellence form the foundation of the new supply chain agenda, these are certainly not new on the one hand, but they undergo a rebirth as they are increasingly resonating in the executive suite and in the boardrooms as a critical driver of supply chain excellence and shareholder value. Those Five pillars are Talent, Technology, Internal Collaboration, External Collaboration, and Managing Supply Chain Changes.

Operational efficiency and the efficient perfect order including cost and inventory can be considered as other important additional factors. With the efficient perfect order as the overarching goal, this firm can build a metrics framework (Dittmann, 2013). The Strategy, of course, is nothing without implementation. Resistance to change, and failure to involve a critical mass of staff in the process, can undermine the most carefully crafted program of innovation (Hughes, Ralf, & Michels, 1998). While Customer Satisfaction can build 'Sticky' Customer Loyalty. Building customer loyalty is hard, but it is one of the most important things for a business. It can cost more to acquire new customers than to keep existing customers (Beard, 2013).

### **Method**

This research emphasizes the assessment of the supply chain at PT AMN. It will be conducted using the Dittman framework as described in Figure 3 below. The sources of the data can be classified into two categories, i.e.:

#### **1. Primary Data**

Primary data represent "firsthand" raw data and structures, and have yet to receive any type of meaningful interpretation.

#### **2. Secondary Data**

Secondary data are historical data structures of variables previously collected and assembled for some research problem or opportunity situation other than the current situation.

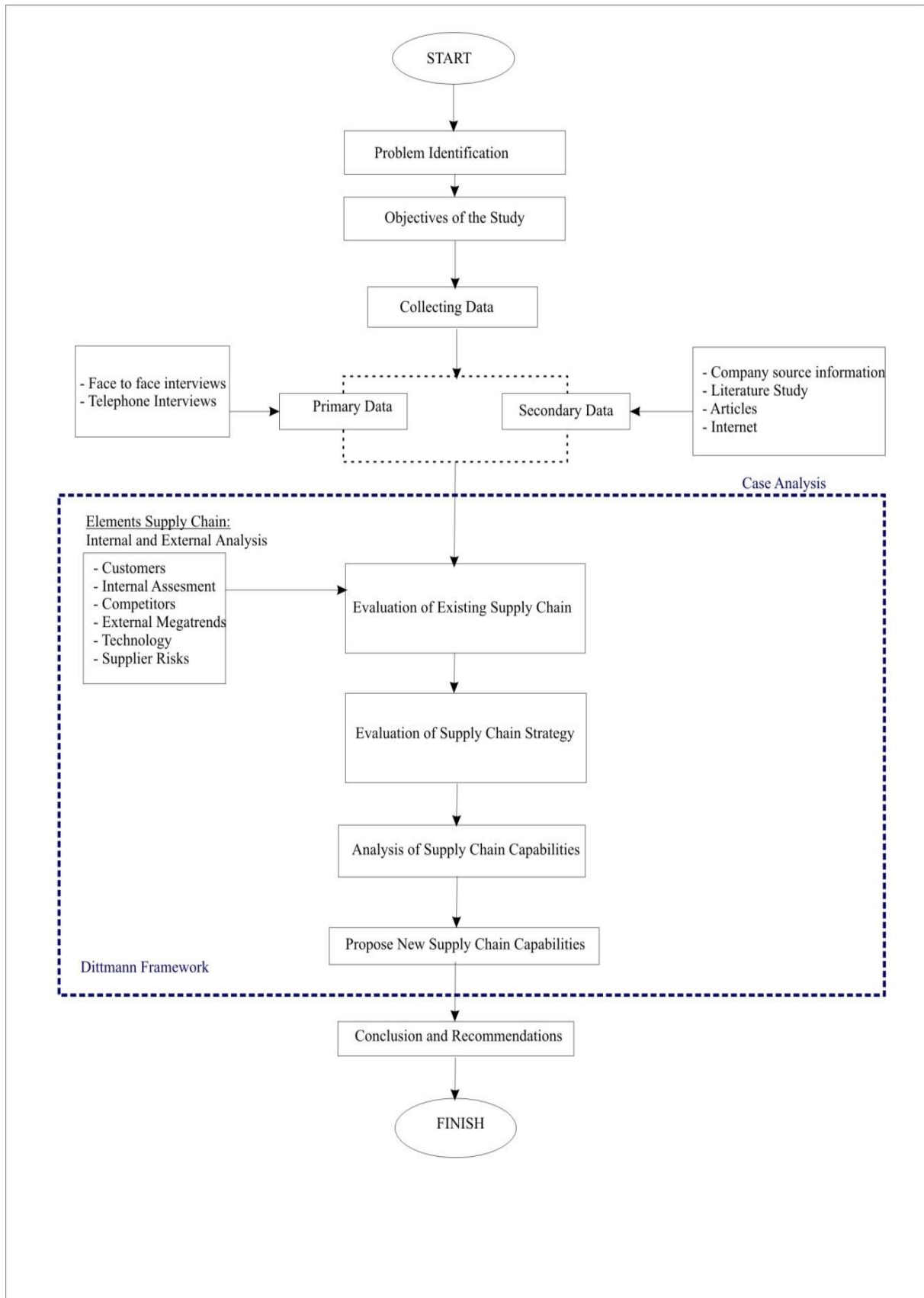
#### **Interview Method and Guidance for Interview**

##### **1. Supply Chain Strategy Evaluation**

The evaluation of the existing supply chain strategy needs to be done, the company can assess the quality of their supply chain strategy. List of questions taken from (Dittmann, 2013).

##### **2. Supply Chain Capabilities Check List**

During the interview to get primary data use the addendum: Supply Chain Capabilities Check List (Dittmann, 2013).



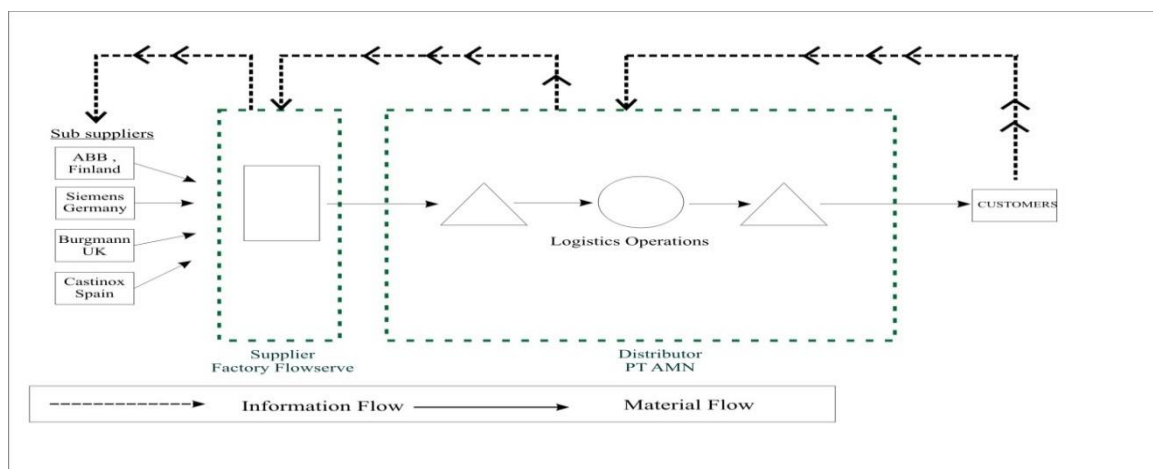
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## Results and Discussion

### ANALYSIS

#### 1. Evaluation of Existing Supply Chain Management of PT AMN

The existing supply chain management of PT AMN described in Figure 4 below is adapted from the Supply Chain model according to (Stadtler, 2014). There are two flows of movements from the customer or the end user to PT AMN as a distributor of the Factory / Manufacturer and vice versa. Those flows of movement are the flow of information and the flow of goods.



**Figure 4: Existing Supply Chain of PT AMN**

#### Analysis Supply Chain Elements: External and Internal of PT AMN

#### 2. Customers

##### 1. Understanding customer's needs and requirements

The supply of equipment in oil and gas projects requires high standards and specifications due to the high safety and reliability requirements of customers.

##### 2. On time delivery

On-time delivery is critical and very important for the whole project plan schedule. The delay of the delivery of equipment is very sensitive as the impact will be significant to the whole project as the delayed completion of the project will affect the PSC's (Partnership Status Contractor's) initial production.

##### 3. The cost competitiveness

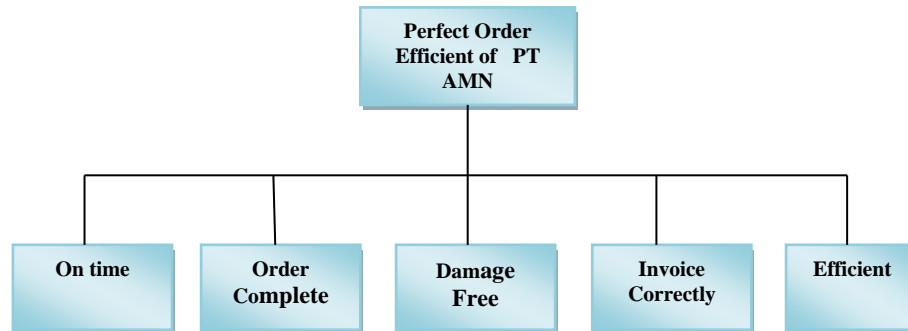
It is another important factor to ensure PT AMN's competitiveness with its competitors. Although this is not the main factor in the oil and gas industry if a competitor can also meet the requirements of Health, Environment, Safety, Quality and Reliability, and Delivery Time required by the customer, then

during bid evaluation, the factor of cost or price will be an important consideration

### 3. Internal Assessment

#### 1. The Perfect Order Metric of PT AMN

The efficient perfect order is the goal of PT AMN. The company will build a metrics framework as illustrated in Figure 5 and the achievement of perfect order of PT AMN is contributed by the entire sub-metrics factor.



**Figure 5: The Chart of Perfect Order Metric of PT AMN**

#### 2. SWOT Analysis

The SWOT analysis of PT AMN shown in Figure 6 is done by the analysis of secondary data, the perfect order metric PT AMN, and the analysis of the existing supply chain of PT AMN.

Strength	Weakness
<ul style="list-style-type: none"> <li>- PT AMN has a team of sales, engineering, and service that performs well</li> <li>- Have human resources with experience, expertise, and high loyalty</li> <li>- Represent a well-known brand as a niche market leader a specific product brings benefits and competitive advantage to the company (PT AMN)</li> </ul>	<ul style="list-style-type: none"> <li>- Have no effective supply chain strategy and capabilities.</li> <li>- There's no alert system from factory to distributor Continue to customer if there's an obstacle or potential delay.</li> <li>- Lack of capability in local packaging.</li> </ul>
Opportunity	Threat
<ul style="list-style-type: none"> <li>- Economic Growth</li> <li>- Commitment to project development</li> <li>- Getting new businesses and more prospects to respond and solve customer's problems.</li> </ul>	<ul style="list-style-type: none"> <li>- Currency Volatility, customers insist on price quotations in US dollars, while the factory is from Europe. This creates uncertainty in contract negotiations, mostly for the factory from the European country.</li> <li>- Customer's low budget will bring unfair and not apple-to-apple competition.</li> <li>- Local content requirements by the Government.</li> </ul>

**Figure 6: SWOT Analysis of Supply Chain of PTAMN**

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### 3. Five Pillar Analysis

The purpose of the five pillars analysis of PT AMN shown in Figure 7 is to compare the internal supply chain capabilities with the five pillars of excellence.

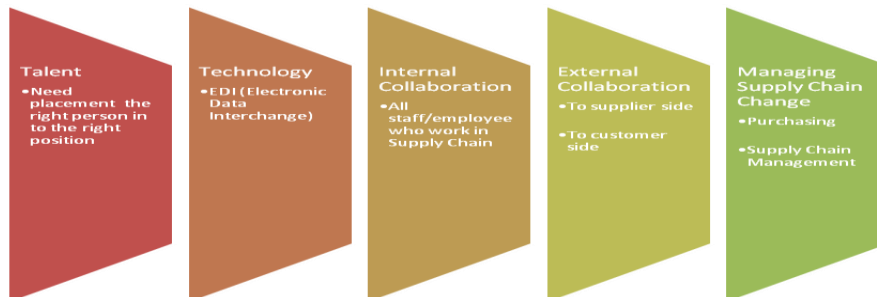


Figure 7: Five Pillars Analysis of PT AMN

### 4. Competitors

The markets for products remain fragmented and highly competitive. The primary competitive drivers are price, technical expertise, timeliness of delivery, contractual terms, previous installation history, and reputation for quality and reliability. PT AMN's main competitors in the Oil and Gas Industry are Sulzer and KSB. Industries experiencing slow growth generally tend to have a competitive environment more heavily influenced by price due to supply outweighing demand, and price competition tends to be more significant for original equipment orders than aftermarket services.

### 5. External Megatrends

1. Political Condition, with the current political condition in Indonesia, where the presidential system is getting more challenging and disturbance by Parliaments, this unstable political condition could impact the investment climate in Indonesia. Potential investors will "wait and see" which may cause the expected economic growth difficult to achieve.
2. Bureaucracy / Permit & Regulation, the game changer is strongly related to the political condition. If the bureaucratic reformation is successful by governments, it can bring positive impacts such as better climate investment conditions and it will attract investors to come and invest in Indonesia.

### 6. Technology

The boosting technology of IT (Information Technology), seems not to bring awareness to the top management in terms of utilizing it in getting cheaper, better, and faster related to existing supply chain strategy/management/system.



Top management and some employees find it difficult to move on in this awareness, in some cases need a person in the internal or external organization who could challenge, motivate, and drive to utilize IT (Information Technology) awareness.

## 7. Risk

Developing a supply chain strategy presents an invaluable opportunity to address risk within a strategic framework. The risk comes into focus after the determination of the customer's need, completion of the internal best practices evaluation, consideration of supply chain megatrends, and evaluation of competition and technology. In doing this risk evaluation, the company strategy team will need to identify the risks, prioritize them, and finally determine ways to mitigate them.

Addressing Supply Chain Risk at PT AMN, after process identifying and prioritizing the three various risks, PT AMN needs to re-assessment the seriousness of the consequences of a delivery delay of goods to the customer, the worst case it will be blacked list or lose the existing customer. Based on the data provided, clearly, the frequency of occurrences is really high, as described in the table performance order. It should become highly awareness to the Management of PT AMN as the seriousness of consequences impacted the company's performance overall.

a) ***Supplier Risk***, one of the big risks faced by PT AMN is a delay of delivery of goods from supplier/factory to PT AMN inbound logistics which will impact the delay of delivery of goods to customer. This delay caused increasing complaints from customers and internally brought a significant financial impact to PT AMN, reducing profit and operational efficiency.

### b) ***Evaluation of the Supply Chain Strategy of PT AMN***

According to (Dittmann, 2013), a score between 100 to 120 points, means that the existing supply chain strategy is good to excellent; between 85 to 100 points, means the company has a reasonable foundation to begin developing a true supply chain strategy. While for a score below 85, means that the company has a great deal of work to do to develop the necessary background to implement a supply chain strategy process. Based on interviews already done with the Director PT AMN, Expediting Manager of PT AMN, Branch Manager Balikpapan of PT AMN, and Branch Manager Cilacap of PT AMN. all scores from them still below 85, means that PT AMN has a lot of homework to develop better strategic planning process in their existing supply chain management. PT AMN needs to review and re-evaluate all factors related to its supply chain. There are no other options that should be taken by PT AMN, except to develop their new supply chain capabilities and drive to go to an excellent supply chain.

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### *c) Analysis of Supply Chain Capabilities at PT AMN*

Based on the result of interviews with the Director, Expediting Manager, Branch Manager - Balikpapan, and Branch Manager - Cilacap, and also after a thorough analysis of supply chain capabilities, it could be identified and summarized the supply chain capabilities of PT AMN shown in Table 1 below. After analyzing the data of PT AMN, customer needs, internal assessment, SWOT analysis, five pillars, the landscape of supply chain technology, existing supply chain, risk management, and data analysis of supply chain capabilities checklist of PT AMN, it can be concluded that the current supply chain capabilities of PT AMN is lower than required for running the business. PT AMN should have an awareness about their condition, and then determine and develop a proposed supply chain capability.

**Table 1: Summary Analysis of Existing Supply Chain Capabilities of PT AMN**

No	Check List Supply Chain Capabilities	Analysis Supply Chain Capabilities of PT AMN
1	Transportation	PT AMN doesn't have their own capabilities in transportation, they rely more on to 3PLs (third party logistics operators). The nature business of distributing for capital goods most likely has not owned their transportation capabilities
2	Warehousing	PT AMN doesn't have their own warehouse, the warehouse for Local Packaging will be more appropriate in terms to reduce cost and sales price, enhance operational efficiency and customer satisfaction
3	Network Optimization	PT AMN needs to build a department of Supply Chain who cross function to all departements and branch offices.
4	Inventory Management	It is appropriate to the spare parts business of PT AMN.
5	SKU (Stock Keeping Unit) Management	It's not applicable to PT AMN
6	Order Management	It's not applicable to PT AMN
7	New Product Introduction	Any new product launched by Factory, PT AMN will continue, forwarding those new products, share info to all customers
8	Forecasting	The sales forecasting of PT AMN required by factory for their booking slot production and budgeting for the cost production, material, man power , etc.
9	Procurement and Vendor Management	PT AMN did not have the system to track lead time delivery in order to aggressively reduce the delay of delivery time to customer.
10	Organization Design and Metrics	PT AMN did not have such organization design and metrics
11	Lean/ Six Sigma	It's not applicable to PT AMN

**d) Propose New Supply Chain Capabilities of PT AMN**

Based on the Evaluation of Existing Supply Chain Capabilities of PT AMN above, to strengthen the supply chain capabilities of PT AMN, the company should develop capabilities in the following areas:

1. Warehousing
2. Network Optimization
3. Procurement and Vendor Management
4. Organization Design and Metrics

The proposed of new supply chain capabilities of PT AMN can be seen in Table 2 below.

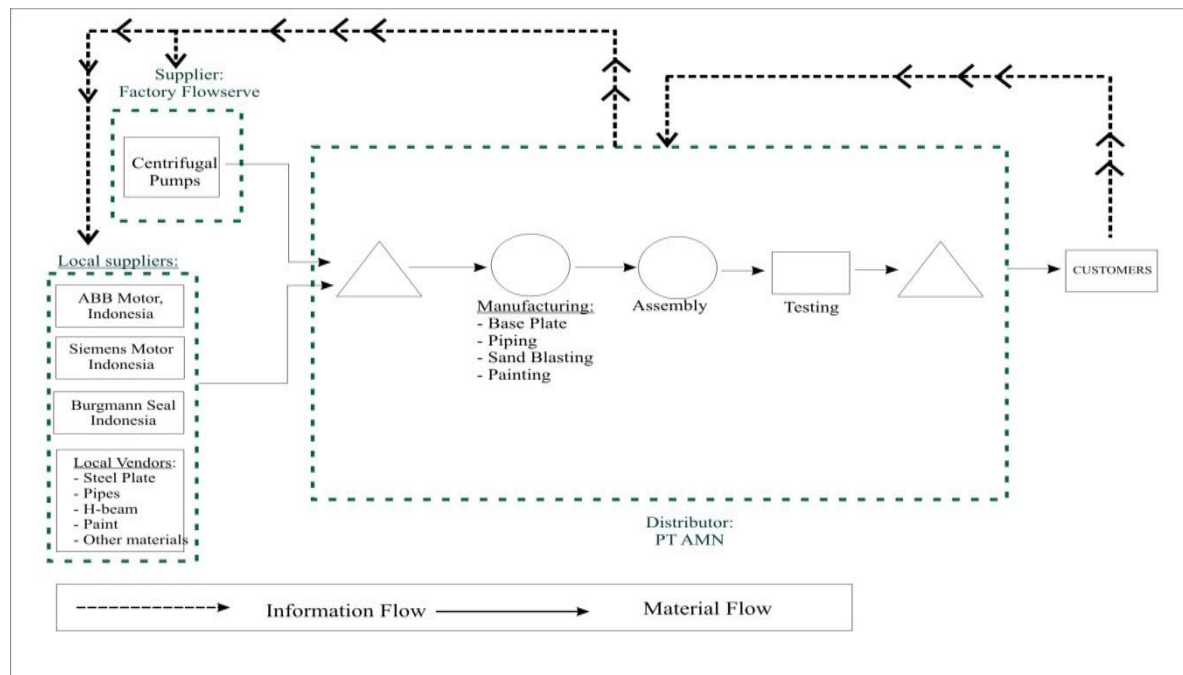
**Table 2: Propose New Supply Chain Capabilities of PT AMN**

No	Check List Supply Chain Capabilities	New Supply Chain Capabilities of PT AMN
1	Transportation	Not applicabe because PT AMN doesn't have their own capabilities in transportation, they rely more on to 3PLs (third party logistics operators).
2	Warehousing	<b>PT AMN doesn't have own warehouse. To reduce cost. sales price, and delivery time PT AMN need to build local packaging capability</b>
3	Network Optimization	<b>PT AMN needs to build supply chain department who cross function to all departments and branch offices to serve customers better</b>
4	Inventory Management	Not applicable for Project Sales, it will be more appropriate to the spare parts business of PT AMN.
5	SKU (Stock Keeping Unit) Management	It's not applicable to PT AMN
6	Order Management	It's not applicable to PT AMN
7	New Product Introduction	Not applicable to PT AMN because PT AMN is the distributor not producer
8	Forecasting	Not applicable to PT AMN because PT AMN is the distributor not producer
9	Procurement and Vendor Management	<b>PT AMN requires integrated procurement and vendor management system to track lead time delivery.</b>
10	Organization Design and Metrics	<b>PT AMN require to build SCM department within the organization design and metrics</b>
11	Lean/ Six Sigma	It's not applicable to PT AMN

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Related to warehousing capability, PT AMN urgently needs to build warehouses for doing local packaging. With regard to enhanced operational efficiency and customer satisfaction, the local packaging will reduce the cost and sales price, and it will also provide faster delivery time.

Figure 8 shows the Proposed Supply Chain to PT AMN.



**Figure 8: Proposed New Supply Chain to PT AMN**

Related to network optimization, starting from identification problems, delay of delivery time, and cascades customer dissatisfaction, network optimization is a must; the company of PT AMN needs to re-organize by adding a Supply Chain Department in their organization, the supply chain activity is done by each function department and branch offices without any pooling and proper managing and coordination.

Related to Procurement and Vendor Management, PT AMN needs to address supplier on-time delivery. In this case study, the principal/Manufacturer acts as a supplier. Based on the case and data analysis, it's found that there is an information lack that deterring PT AMN from delivering the goods on time to the customer.

Related to Organization Design and Metrics, PT AMN should reorganize and provide a Supply Chain department that can cross functions to all departments related. This kind of arrangement will create a better environment and support faster decision-making. Currently, the factory or manufacturer provides a Purchase Order (PO) un-priced copy of their sub-suppliers. The information provided includes the date of PO, specification, scope of supply, and delivery time.

This kind of information will be meaningless if there is no monitoring either done by the factory/manufacturer or by PT AMN. The difficult problem appears if the delays

happen from sub-vendors at the last minute. With that condition, it will be difficult to take a mitigation plan either by Factory/Manufacturer, PT AMN, or even by Customers. The impact of this problem can be very significant in the production of the goods and their delivery time. Based on the experience so far, the delivery to the customer could be delayed until 3 months or 90 days. Some projects even have a massive impact on the customer's whole plan project, and the loss of customers not only the huge money but also their credibility in front of their end users.

## **Conclusion**

Delay is one of the critical issues in the Oil and Gas Industry. The delay of projects will impact the lifting of oil and gas and the target of production of PSC (Partnership Status Contractor). PT AMN as one of the stakeholders in the Oil and Gas Industry has contributed to the whole project performance in the Oil and Gas Industry. The following are the conclusions of this thesis: Based on the secondary data, there are highly frequent delays in goods delivery to customers. Referring to primary data which is collected by interviews with the Director, Expeditor Manager, and Branch Managers, it shows that PT AMN didn't have an effective Supply Chain strategy. Further, based on the checklist interview for supply chain capabilities, PT AMN needs to develop its supply chain capabilities. PT AMN should achieve on-time delivery by overcoming the lack of information with its suppliers and its sub-suppliers. This is done by focusing on supplier collaboration and supplier lead time reduction and closely monitoring and updating status during process manufacturing. The purpose is to prevent any potential delay at the earliest stage possible and to provide a proper corrective action plan that can involve customers and suppliers.

Developing new supply chain capabilities of PT AMN is achieved by revamping the supply chain at PT AMN. In order to minimize complaints and penalties from customers and to enhance customer satisfaction, PT AMN needs to focus on the customer by adding the SCM (Supply Chain Management) Division in the organization. The SCM Division will take care of and respond proactively to customers, then coordinate across internal organizational functions such as Project Sales, Engineering, and Service and Finance divisions. The SCM division will also coordinate with external parties: Suppliers, Third party logistics, Third party inspectors, etc. Additionally, the SCM division will also develop Information Technology to boost the flow of information between PT AMN, suppliers, and sub-suppliers with an enhanced EDI (Electronic Data Interchange). To enhance operational efficiency, PT AMN should embrace sustainability as a cost-reduction strategy by doing local packaging. PT AMN urgently needs to set up a warehouse for doing local packaging. With regard to enhancing operational efficiency and customer satisfaction, local packaging will reduce the cost and sales price and at the same time provide faster delivery time. PT AMN needs to enhance customer satisfaction by doing a customer satisfaction survey once a project is closed or goods have been shipped. Here are the benefits that PT AMN will gain by tracking customer satisfaction: identifying at-risk customers who are unsatisfied and potentially going to turn to competitors, identifying common problems that are happening repeatedly, and utilizing this intelligence to proactively prevent problems happening again which leads to customers' satisfaction.

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