

THE BRAZILIAN MARKET FOR FORESTRY MACHINERY

Case: Ponsse Latin America Ltda

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ABSTRACT

This thesis has two goals: to analyze Ponsse Latin America Ltda's distribution channels and customer services in the Brazilian forestry market, and to identify a new potential customer group. Ponsse Oyj is Finland's biggest forestry machinery producer and it is only natural that the company searches for new markets in South America, where Brazil has the largest natural and planted forest areas.

The Brazilian forestry sector growth tendency is based on solid investments made by companies that are consumers of wood and owners of the planted forest areas. Planted forests are the main source of all wood consumed in Brazil without significant volumes of imported wood. In 2009, the average annual growth of planted forest area was 2.5%, whereas in 2008 it was 5.4%.

Investment in greenfield sites and planned expansions of existing pulp and paper mills, postponed during the worst periods of the global financial crisis, are currently being carried out. Global demand for wood is picking up and returning to pre-crisis level and the importance of forest outgrower schemes is noticeably higher. All in all, this favorable scenario presents Ponsse Latin America Ltda an important opportunity to increase its market share in Brazil.

This thesis was written using qualitative methods and a mix of primary and secondary sources. To conclude, this thesis suggests that a re-evaluation of Ponsse Latin America Ltda's marketing strategies can be beneficial to the company in order to strengthen relationships with its business partners, and to establish distribution channels and to better exploit its competitors' flaws.

Keywords: harvester, forestry machinery, consumer service, distribution channel, Ponsse, Brazil

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THERMINOLOGY

Full tree	Tree is felled and transported to the roadside with limbs and tops intact
Tree-length	Tree is harvested, delimbed and topped at the stump. The trunk is transported to the mill whole or almost whole
Cut-to-length	Tree is harvested, delimbed, bucked and cut into log assortments on the felling site
Forest outgrower	Contractual partnership between growers or landholders and a company for the production of commercial forest products
Eucalypt	Woody plants belonging to three closely related genera: Eucalyptus, Corymbia and Angophora
Pine	Coniferous tree in the genus Pinus, in the family Pinaceae
Hectare	Unit for measuring area, equal to 10,000 square meters

1 INTRODUCTION

1.1 Background of the thesis

One of the reasons why Brazil stands out in the forestry business is the high productivity of its planted forests, although the country has a relatively small area of planted forests, about 6,310,450 ha in 2009. Continuous research and development in seeds enhancing techniques, and the country's favorable environmental conditions are held responsible for the fast growth rate of the planted forests and high quality of the harvested wood, both soft and hard ones (MMA 2009, 25).

Brazilian planted forests are the result of heavy private investments made by industries such as pulp and paper, reconstituted wood-based panels, and charcoal-based iron and steel industries. It is not a coincidence that these companies are also the major owners of the planted forests (ABRAF 2010, 20).

The expansion of the total area of planted forests is one of the most important indicators of good performance in the forestry sector. Forecasts of growth in consumption of wood for 2010 are important indicators of economic recovery in Brazil. Another positive signal of the above mentioned recovery is that investors unaffiliated with the industry - investment funds and individual investors - have shown increasing interest in investing in the training of forest bases and acquisition of forest assets that already exist (Revista Opiniões 2009).

Timber harvesting is a complex activity that is influenced by several factors that have a direct influence in the execution of such operations. It is estimated that timber harvesting counts for up to 50% of the total costs of raw wood delivered to the mill courtyard (Ponsse News 2.2008).

Worldwide there are several methods in use to harvest trees, but the most commonly found ones are tree-length and cut-to-length methods. Using the tree-length method, trunks are delimited in the forest and transported to the mill whole or almost intact. At the mill, the trunks are processed according to their use, e.g. sawlogs and pulpwood. As per the cut-to-length method, the trunks are cut in the forest into various log assortments for different uses, e.g. sawlogs, bolts and pulpwood (Ponsse 2010).

Ponsse Latin America Ltda is specialized in forest machines designed for the cut-to-length method and related information systems. About 55% of the world's wood harvest is done manually using chainsaw or axe and the remaining 45% is harvested mechanically using either the cut-to-length (CLT) or tree-length (TL) method. From the mechanically harvested portion, the usage percentage of either TL or CLT methods is: circa 65% uses TL and remaining 35% uses CLT (Ponsse News 2.2008).

In order to supply the growing demand for wood, the total forested area shall be expanded and wood harvesting processes modernized. However, strong competitors are found in Brazil and Finnish producers of forestry machinery must be willing to adopt new strategies to thrive in a competitive environment.

1.2 Objectives of the thesis

The first goal of this thesis is to analyze Ponsse Latin America Ltda's distribution channels and customer services in the Brazilian forestry market, taking into consideration the logistics solutions required to attend to the market. In such respect, this thesis describes the Brazilian forestry market characteristics and main players.

The second goal of this thesis is to identify a new potential customer group for Ponsse Latin America Ltda forestry machines. Forest outgrowers are not the

preferential target of Ponsse Latin America Ltda in Brazil, mostly because of their perceived financial constraints.

Yet, the forest market scene is changing in a favorable direction for the forest outgrowers, whose number is increasing on a consistent basis and whose leverage with Ponsse's competitors has not gone unnoticed. Before making any attempt to diversify its client portfolio, the company should be able to analyze its business strategies in order to find out whether the pursuit for sales increase would actually be beneficial or contribute to a slowdown in the company's performance.

1.3 Research questions

- What should Ponsse Latin America Ltda do to strengthen its competitiveness in Brazil?
- How to boost sales of hybrid harvesters in the Brazilian forestry market?

1.4 Research methodology

This thesis is formatted as a case study. Case study methods investigate a social phenomenon through the analysis of an individual case. All data relevant to the case are gathered and organized in terms of the case. It provides an opportunity for the intensive analysis of many specific details often overlooked by other methods. (Kumar 2005, 113.)

This thesis makes use of a deductive approach. In deductive approach, a theory or hypothesis is developed first, and then a research strategy is designed to test the hypothesis. (Saunders, Lewis & Thornhill 2003, 85.)

The research method chosen for this thesis is the qualitative one. Qualitative research includes an array of interpretative techniques which seek to describe,

decode, translate and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world. (Cooper & Schindler 2008, 162.)

This thesis was written according to qualitative methods, which are best suited since the thesis is formatted as a case study. Qualitative research methodology is rooted in social science and deals with understanding people's behavior, knowledge, attitudes, fears, beliefs etc. Qualitative data is based on meanings expressed thru words.

For the purposes of writing this thesis, data was collected from primary sources, i.e. interviews with Ponsse Latin America Ltda staff. Secondary sources were also used and they comprehend an array of company's brochures, financial market information, articles from newspapers and specialized magazines.

1.5 Scope and limitations

There are some sensitive issues about forest plantations in Brazil, among them: land right disputes between native Indian tribes and forest owners; misuse of forestation permits and illegal deforestation in preserved areas of native species. There is plenty of literature about such disputes and a tendency to view the forestation business in a negative way. However, one must make an effort to disassociate a legitime business activity from the previously mentioned conflicts.

One of the most important characteristics of the Brazilian forest market is that planted forests are owned by the pulp and paper and other forest-based industries. It is important to point out that the amount of planted forest owned by private individuals is not significant in Brazil, whereas in Finland there are almost one million forest owners. This thesis does not refer to the exact number of private forest owners in Brazil due to the fact that such activity is classified as agribusiness and no relevant data was found when collecting data.

There is very little literature concerning the Finnish participation in the Brazilian forestry market and even less data referring to sales of forestry machinery of Finnish origin in Brazil, hence this thesis ignores economic and financial aspects of Ponsse Latin America Ltda activities in Brazil and focuses only on the company's distribution channels and logistics solutions used to service its clients.

1.6 Thesis structure

This thesis consists of two parts: theoretical framework and empirical part. The theoretical framework starts on the second chapter with an introduction to marketing strategies and distribution channels. The third chapter deals with customer service and logistics systems. The fourth chapter explains the main characteristics of the Brazilian forestry industry.

The fifth chapter ends the theoretical part of this thesis with an overview of timber harvesting methods. The sixth chapter marks the beginning of the empirical part, keeping the main focus on Ponsse Latin America Ltda operations in Brazil. In sequence, conclusions are available in the seventh chapter.

2 MARKETING STRATEGIES AND DISTRIBUTION CHANNELS

2.1 Definition of strategy

Marketing is not only much broader than selling; it is not a specialized activity at all. It encompasses the entire business. It is the whole business seen from the point of view of its final result, that is, from the customer's point of view. Concern and responsibility for marketing must therefore permeate all areas of the enterprise (Baker 2007, 19).

Strategy is the pattern or plan that integrates an organization's major goals, policies, and action sequences into a cohesive whole. A well-formulated strategy helps marshal and allocates an organization's resources into a unique and viable posture based upon its relative internal competences and shortcomings, anticipated changes in the environment, and contingent moves by intelligent opponents. (Baker 2007, 55.)

At the business level, strategic decisions focus on how to compete in an industry or product-market. Business level strategy deals with achieving and maintaining a competitive advantage. Strategic decisions at the business level are concerned with selecting target market segments and determining the range of products to offer. (Baker 2007, 55.)

The essence of strategy is in the activities – choosing to perform activities differently or to perform different activities than rivals. Otherwise, a strategy is nothing more than a marketing slogan that will not withstand competition (Baker 2007, 23).

Porter's (Baker 2007, 207) strategy model consists of five attributes: one ideal competitive position in the industry; benchmarking of all activities in achieving best practice; aggressive outsourcing and partnering to gain efficiency; advantages

rest on a few key success factors, critical resources, core competences; flexibility and rapid response to all competitive and market changes.

2.2 Business strategy

A well-known typology developed by Miles and Snow (1978) identifies four kinds of business strategies:

- Prospectors are firms that take an aggressive and proactive approach to the market. With a strong emphasis on new product development, prospectors pursue market opportunities as they perceive them, often without detailed research and analysis. They see ‘first mover advantages’ as a means of charging high prices (skimming) and establishing a dominant position before competition can react.
- Defenders take the opposite approach to prospectors. They believe in establishing a strong and stable position in the market, which they then defend from attack by offering value for money to loyal customers in a largely mature, replacement market.
- Analysers pursue an intermediate strategy, which combines both new product development and defence of their existing markets with a balanced portfolio of products at different stages of development.
- Reactors are firms that, effectively, do not have a strategy as they only respond to moves made by their competitors. (Baker 2007, 65.)

Kotler (Baker 2004, 308) asserts that specialization is the key to successful niche strategies and suggests 10 specialist roles open to the market niche: end-use specialist, vertical-level specialist, customer-size specialist, specific-customers specialist, geographic specialist, product or product-line specialist, product-feature specialist, job-shop specialist, quality/price specialist, service specialist. Ponsse Oy can be defined as a *product-feature specialist*, as it only manufactures forest machines that use the cut-to-length technology.

2.3 Distribution channels

Distribution has a key role in the formulation of marketing strategies. It is necessary to gain access to consumers who are physically distant from the production unit and this will depend upon the creation of physical means of distribution together with the development of institutions and institutional devices to serve and manage these distribution channels (Baker 2007, 411).

Physical distribution channel is the term used to describe the method and means by which a product or a group of products are physically transferred, or distributed, from their point of production to the point at which they are made available to the final customer. In general, this end point is a retail outlet, shop or factory, but it may also be the customer's house, because some channels bypass the shop and go direct to the consumer. In addition to the physical distribution channel, another type of channel exists. This is known as the trading or transaction channel. The trading channel is also concerned with the product, and with the fact that it is being transferred from the point of production to the point of consumption. The trading channel, however, is concerned with the non-physical aspects of this transfer. These aspects concern the sequence of negotiation, the buying and selling of the product, and the ownership of the goods as they are transferred through the various distribution systems. One of the more fundamental issues of distribution planning is regarding the choice and selection of these channels. (Rushton et al. 2006, 56.)

Channel strategy refers to the broad principles through which the firm seeks to achieve its distribution objectives. Distribution objectives are usually set in terms of how, when and where the firm plans to have its products made available to its target market (Baker 2007, 410).

2.3.1 Selecting and formulating the distribution channel

Buclin (1965) argues that consumer demand determines what services are required and what value is placed upon them, and this will result in the evolution of the most efficient and cost-effective channel structure. Thus for convenience goods, ready and widespread availability is a sine qua non and we are likely to find the producer using multiple channels involving both direct and indirect sales to achieve the maximum market coverage. Conversely, for many industrial goods, the variation in consumer demand leads to greater postponement so that precise needs can be articulated and frequently results in shorter channels and a greater dependence upon personal interaction between buyer and seller (Baker 2007, 415).

Important decisions involved in choosing a channel structure include (Rosenbloom 1999):

1. The length of the channels
2. Intensity at various levels
3. The types of intermediaries involved

Intensity refers to the number of intermediaries to be used as is usually described in terms of:

- Intensive distribution involving as many outlets and intermediaries as possible
- Selective distribution where intermediaries are chosen according to their ability to meet certain criteria
- Exclusive distribution where only one distributor is appointed to serve a given area (Baker 2007, 415).

According to Rosenbloom (1999), the most widely used performance criteria for evaluating channel members' performance are:

1. Sales performance
2. Inventory maintenance
3. Selling capabilities

4. Attitudes
5. Competitive products handled
6. Growth prospects (Baker 2007, 415).

To some extent, cost efficiency and maximizing consumer satisfaction are conflicting objectives and lead to the classic dilemma in choosing channels of distribution – the trade-off between cost versus control. (Baker 2007, 416.)

Louis Stern (1965) defines channel control and its implications succinctly when he writes:

Channel control [signifies] the ability of one member of a marketing channel for a given product (or brand) to stipulate marketing policies to other members. For example, in a simple channel where a buyer interacts directly with the seller, the party gaining control in the bargaining process either through the use of sheer economic power, political or legal means, superior knowledge, more subtle promotional aids, or other methods obtains a major advantage in all aspects of their relationship. When marketing policies may be stipulated by any one party, this may have a marked influence on the efficiencies of both. Their goals may not be totally compatible; therefore, by complying with the dictates of buyers, for example, sellers may frequently be forced to alter their methods of operation in a manner that is not often profitable for them (Baker 2007, 416).

Obviously there are many situations where the seller will have to accept an inevitable discrepancy in bargaining power between themselves and their customer, but equally there are many other situations where a creative marketing approach may minimize or eliminate control over one's affairs. This is particularly true of the distribution functions where it may be possible to retain a larger measure of control by performing channel functions oneself rather than using the more cost-effective services of an intermediary, e.g. in the level of servicing and / or maintenance provided, of the inventory held etc. In turn, by providing greater user satisfaction one may be able to secure higher prices and so offset the additional costs. (Baker 2007, 417.)

When selecting a distribution channel, one must pay particular attention to the environmental situation, to the product and market characteristics and the company's own strengths and weaknesses (see Appendix 1).

Environmental:

Market structure: number and location of both suppliers and users

Market conduct: degree of concentration and nature of competition

Market performance

Legislation / regulation

Institutional infrastructure: what channels are available and what are their distinguishing characteristics

Product characteristics:

Class of product

Bulk / volume

Price / value

Durability / perishability

Seasonality

Service requirements

Market characteristics:

Benefits looked for

Geographic location

Discernible segments

Company strengths and weaknesses:

Size

Competitive standing

Goodwill – how much with whom

Service and technical abilities. (Baker 2007, 417.)

Consideration of these factors will inevitably lead one to consider the relative merits of three basic strategies: undifferentiated, differentiated and concentrated

marketing with their associated distribution strategies: intensive, selective and exclusive distribution. (Baker 2007, 417.)

An undifferentiated strategy rests on the assumption of user homogeneity and / or an implicit acceptance that one has no prior ability to segment a market and so must appeal to all of it. Either way, maximum distributive coverage is called for, that almost invariably will require one to use the services of intermediaries to secure it. (Baker 2007, 417.)

By contrast, differentiated marketing implies an ability to segment a market and to cater to the varying needs of the different segments. In these circumstances some segments are likely to be more important to a given producer than others, and so justify a direct approach, while intermediaries may be used to reach more dispersed segments or those with particular needs best served by another channel member, e.g. a manufacturer of industrial equipment might sell direct to major users and through distributors or agents to increase geographical coverage. (Baker 2007, 417.)

Finally, concentrated marketing calls for highly selective distribution. It also implies a smaller supplier, hence the concentration on only one segment, and so will require the use of intermediaries in all but the most geographically concentrated markets. However, with the advent of the internet even the smallest suppliers can, theoretically, obtain access to those linked to it – a major factor underlying the growth of e-commerce. (Baker 2007, 417.)

A very large number of factors may influence the structure of distribution channels between manufacturers and consumers. It is also clear that the weighting given to any particular factor will vary over time due to changes in the environment and / or in accordance with the perception of the individuals or organizations that comprise the channel. Thus, while it may be possible to define and describe theoretically “optimum” channels in terms of objective cost factors, the perception of producers, intermediaries and consumers may all conclude that such an “optimum” arrangement will not optimize their own objectives and yield the

desired satisfactions. How does one establish a distribution policy? (Baker 2007, 420.)

Luck and Ferrel (1979) recognize the importance of the decision when they comment:

A fundamental strategic decision will be whether to pull the product thru the channel by concentrating on the final purchasers or whether to push it through by gaining the cooperation of middlemen. A decision to push or to pull the product will determine whether to aim messages or where to send sales people (Baker 2007, 417).

2.4 Foreign market entry strategies

A market entry strategy consists of an entry mode and a marketing plan. The mode of entry is what is used to penetrate a target country while the foreign marketing plan is used to penetrate target market. The entry mode is important as it determines the degree of a company's control over the marketing mix program, and to an extent the degree of its commitment, in the target market. Implementing a strategy for each market is analogous to establishing a channel of distribution. This may be for initial or continued entry. (Albaum & Duerr 2008, 270.)

2.4.1 Channel structure

A company's international marketing channel is the path in the structure of distribution through which the products of the company reach the final consumer or user. From the company's point of view, the structure of distribution consists of the marketing channels currently available in a foreign market together with those channels by which the market is reached in the first place. Thus, the structure of distribution for reaching any foreign market includes all the companies, marketing

agencies or institutions that are in use by all companies at any given time, their capacities, and their geographic coverage. (Albaum & Duerr 2008, 271.)

International business is a complex undertaking that requires numerous organisations to work together as a coordinate team. These organisations, or participants, contribute various types of expertise and inputs that facilitate international business. The participants vary in terms of their motives for going international, modes of entry, and types of operations. There are three major categories of participants:

1. A focal firm: the initiator of an international business transaction, including multinational and small/medium size enterprises, that conceives, designs, and produce the offerings intended for consumption by customers worldwide. Some are privately owned companies, others are public, stock-held firms, and still others are state enterprises owned by governments. Some firms are manufacturing business, while others are in the service sector.
2. A distribution channel intermediary is a specialist firm that provides a variety of logistics and marketing services for focal firms as part of the international supply chain, both in the home country and abroad. Intermediaries such as distributors and sales representatives are typically located in foreign market
3. A facilitator is a firm or an individual with special expertise in legal advice, banking, customs clearance, or related support services that assist focal firms perform international business transactions. Facilitators include logistics services providers, freight forwarders, banks, and other support firms that assist focal firms perform specific functions. A freight forwarder is a specialized logistics service provider that arranges international shipping on behalf of exporting firms, much like a travel agent cargo. Facilitators are found both in home and foreign markets (Cavusgil et al. 2008, 62-63.).

In international business, the focal firm may retain core activities such as production and marketing within its own organization and delegate distribution and customer service responsibilities to independent contractors, such as foreign-

market based distributors. Therefore, the resulting business system is subject to internationalization; that is individual value-adding activities can be configured in multiple countries. (Cavusgil et al. 2008, 64.) The figure below shows the participants in the international distribution channel:

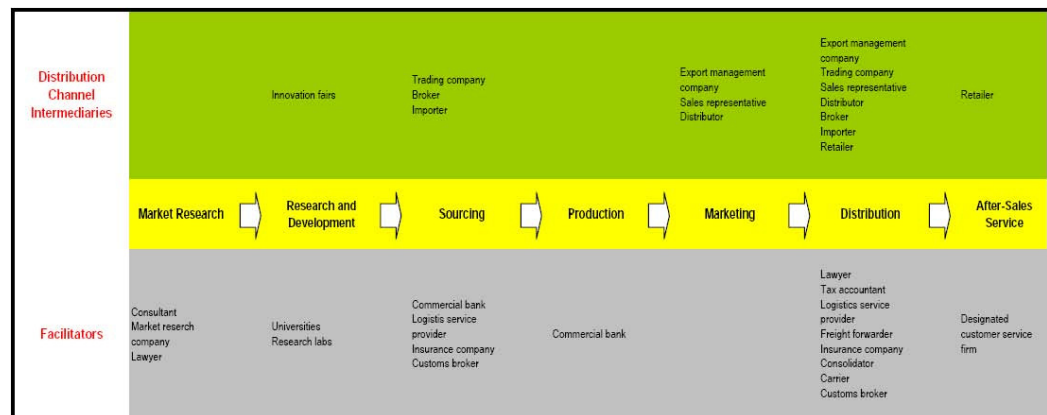


FIGURE 1. Participants in the international distribution channel (Cavusgil et al. 2008, 64)

Intermediaries are physical distribution and marketing service providers in the value chain for focal firms (as seen in the figure above). They move products and services in the home country and abroad, and perform key downstream functions in the target market on behalf of focal firms, including promotion, sales, and customer service. They may organize transportation of goods, and offer various logistics services such as warehousing and customer support. Intermediaries are of many different sizes, ranging from large international companies to small, highly specialized operations. For most exporters, relying on an independent foreign distributor is a low-cost way to enter foreign markets. The intermediary's intimate knowledge, contacts, and services in the local market can provide a strong support system for exporters that are inexperienced in international business or too small to undertake market-based activities themselves. There are three major categories of intermediaries: those based in the foreign target market, those based in the home country, and those that operate through the internet. (Cavusgil et al. 2008, 75.)

The third category of participant in international business is the facilitator. They are independent individuals or firms that assist the internationalization and international operations of focal firms. Examples include banks, international trade lawyers, freight forwarders, customs brokers and consultants. Some facilitators are supply-chain management specialists, responsible for physical distribution and logistics activities of their client companies. (Cavusgil et al. 2008, 81.)

Decisions on international marketing channels influence the price that final users or consumers pay. For example, the margins required, and obtained, by independent organizations such as export merchants or wholesalers in the foreign market often constitute a significant share of the price paid by the final buyer. In some instances, if the marketing agencies can be eliminated from the channel, the price can be reduced. On the other hand, it should be recognized that eliminating such an organization may lead to an increase in price simply because the remaining channel members can not perform certain activities as efficiently as a marketing agency that is able to specialize in the performance of these activities. (Albaum & Duerr 2008, 273.)

Entry into foreign markets, initially and on a continuing basis, should be made using methods that are consistent with the company's strategic objectives. From a strategy perspective, entry mode is influenced by the international strategy pursued by the firm for its foreign venture or market expansion. All market entries may not be motivated by the same international strategy for a particular foreign market entry. (Albaum & Duerr 2008, 275.)

2.4.2 Company resources

In the final analysis, it is often the size and the financial strength of the company that is the most important in determining channel strategy. Only a fairly large and

cash-rich company can afford to set up a distribution structure that includes all of its own warehousing and transport facilities. A formalized approach that might be adopted when undertaking the design of a channel structure is set in the figure below: (Rushton et al. 2006, 93.)

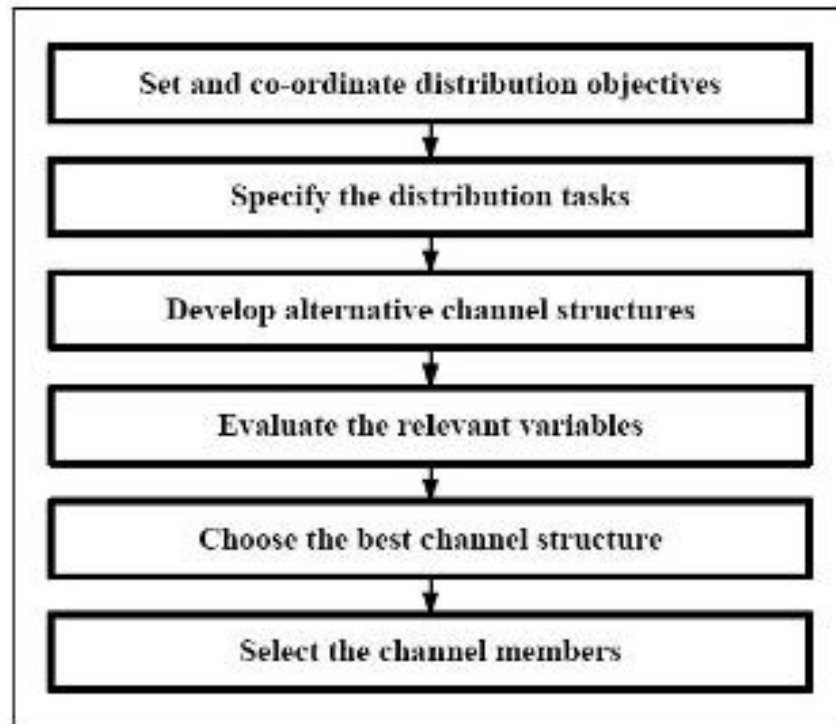


FIGURE 2. Designing a channel structure – a formalized approach (Rushton et al. 2006, 65)

The figure above represents a channel structure conceived by Rushton et al. With these, the company has more control and can provide the services it thinks its customers require. Smaller and less financially secure companies may have to use intermediaries or third-party organizations to perform their distribution function. (Rushton et al. 2006, 93.)

3 CUSTOMER SERVICE AND LOGISTICS SYSTEMS

This chapter presents the items comprehended in the order management and customer service cycles. In order to present the elements of logistics system that culminate with the delivery of a product to its buyer, it is necessary to understand the role of logistics in establishing customer service goals and objective.

Fuller, O’Conor and Rawlinson (1993) emphasize that companies do not create value for customers and sustainable advantages for themselves merely by offering varieties of tangible goods. Rather, they offer goods in distinct ways, presuming that consumers value convenience, reliability, and support (Johnson et al. 1999, 99).

3.1 The logistics components of customer service

The logistics components of customer service can be classified in different ways. They may be seen as transaction-related elements, where the emphasis is on the specific service provided, such as on-time delivery, or they may be seen as functional attributes that are related to overall aspects of order fulfillment, such as the ease of order taking. (Rushton et al. 2006, 35.)

The classification seven “rights” of customer service, showing the main service transaction elements are usually divided into three categories. These reflect the nature and timing of the particular service requirements (before, during and after delivery of the product).

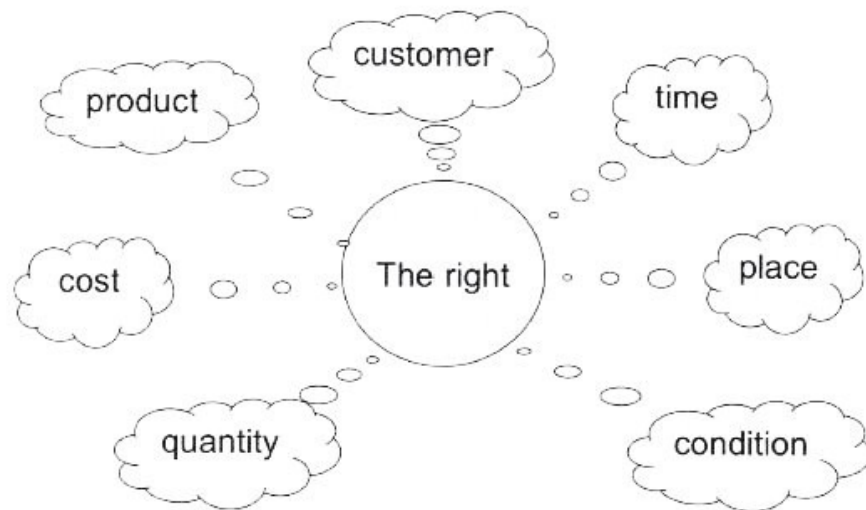


FIGURE 3. The seven “rights” of customer service (Rushton et al. 2006, 36)

The seven “rights” of customer service shown above are directly related to service transaction elements, whose three main categories are explained, as follows:

1. Pre-transaction elements: these are customer service factors that arise prior to the actual transaction taking place. They include:
 - written customer service policy
 - accessibility of order personnel
 - single order contact point
 - organizational structure
 - method of ordering
 - order size constraints
 - system flexibility
 - transaction elements
2. Transaction elements: these are the elements directly related to the physical transaction and are those that are most commonly concerned with distribution and logistics. Under this heading would be included:
 - order cycle time
 - order preparation
 - inventory availability

- delivery alternatives
 - delivery time
 - delivery reliability
 - delivery of complete order
 - conditions of goods
 - order status information
3. Post-transaction elements: these involve elements that occur after the delivery has taken place, such as:
- availability of spare parts
 - call-out time
 - invoicing procedures
 - invoicing accuracy
 - product tracing / warranty
 - return policy
 - customer complaints and procedures (Rushton et al. 2006, 65.)

3.2 Order management

Order management refers to the activities that take place in the period between the time a firm receives an order and the time a warehouse is notified to ship the goods to fill that order. (Johnson et al. 1999, 101.) In other words, order management refers to how a firm handles incoming orders.

From the seller's viewpoint, an order cycle is the lapse of time when an order is received from a client till the moment the goods are delivered to the client's receiving point. As for the buyer's standpoint, the order cycle starts out when the order is sent to the seller till the moment the goods are received. The shorter and more consistent the order cycle is, the less inventory is needed by one's customer (Johnson et al. 1999, 101).

Johnson et al (1999) state that many firms analyze their customer service standards in terms of five aspects, or stages, of the order cycle: order planning, order transmittal, order processing, order picking and assembly, and order delivery.

Whenever a high percentage of customers place their orders at the same time, overloading the manufacturer's order handling system, the entire order handling cycle is expanded and as a result the company's customer service becomes slow. This is called bunching. It can be avoided by using an Order planning system to even out workloads in the manufacturing premises and minimize the peaks and valleys in the order handling process.

Order transmittal is the series of events that occur between the time a customer places or sends an order and the time the seller receives the order. Order processing typically includes such activities as the following: (1) the order information is checked for completeness and accuracy; (2) a credit check is made by the credit department; (3) the order is "entered" into the system so it may be filled and this step is known as Order entry; (4) the marketing department credits the salesperson with the sale; (5) the accounting department records the transaction; (6) the inventory department locates the closest warehouse to the customer, advises it to pick the shipment, and updates the firm's master inventory controls; (7) the traffic department arranges for the shipment's transportation from the warehouse site. (Johnson et al. 1999, 105.)

In cases of export of goods, the order arrives in the form of letter of credit, which is a bank document guaranteeing payment after all conditions are met (usually meaning that the product is delivered to the buyer in good order). An international freight forwarder is retained both to prepare shipping documents and to make arrangement with the ocean carrier. A number of documents must be assembled, and some are delivered to the port of export. If some are late, they are flown to meet the cargo at the port of import. Once the shipment arrives in good order, the bank is notified and the seller paid. (Johnson et al. 1999, 105.)

The next stage of order management is order picking and assembly. It starts with producing a document telling a specific warehouse to assemble a given order for a customer. The order-picking list indicates which items to assemble. The order-picking and assembly function includes all activities from the time the warehouse receives an order to ship items until goods are loaded aboard an outbound carrier. A packing list is enclosed with each outgoing order, indicating what items were picked and the initials of the individuals who prepared the order for shipment. The consignee checks the packing list on receipt of the order and verifies that all items are present. (Johnson et al. 1999, 106.)

The final phase of the order cycle is order delivery, the time from when a carrier picks up the shipment until it is delivered to the customer's receiving dock. Carriers establish their own service standards, and shippers using them have to incorporate the carrier's estimated delivery times into calculations of the entire length of the order cycle. (Johnson et al. 1999, 108.)

When the five stages of the order cycle – order planning, order transmittal, order processing, order picking and assembly, and order delivery – are carefully run and skilfully coordinated, impressive gains in performance can be realized. The firm is then able to use the order cycle as a potent marketing and sales tool. (Johnson et al. 1999, 108.)

3.3 Customer service definition and importance

Customer service is the collection of activities performed in filling orders and keeping customers happy, or creating in the customer's mind the perception of an organization that is easy to do business with. It is an excellent competitive weapon and has a special advantage over price competition. (Johnson et al. 1999, 108.)

Christopher et al. (1979) define customer service as a 'system organized to provide a continuing link between the time that the order is placed and the goods

are received with the objective of satisfying customer needs on a long-term basis' (Baker 2007).

There are few companies that do not recognize the importance of the provision of good customer service. But, why is it so important? There are many different answers to this question, ranging from the growth of competition to the raising of customers' expectations to the similarity of the basic products that are offered. One way of considering customer service is to differentiate between the core product itself and the service elements related to the product. (Rushton et al. 2006, 34.)

The core product concerns the item itself: the technical content, the product features, the ease of use, the style and the quality. The service elements, which can be called the 'product surround', represent the availability of the product, the ease of ordering, the speed of delivery, and after-sales support. (Rushton et al. 2006, 34.) The figure below illustrates core product and surroundings:

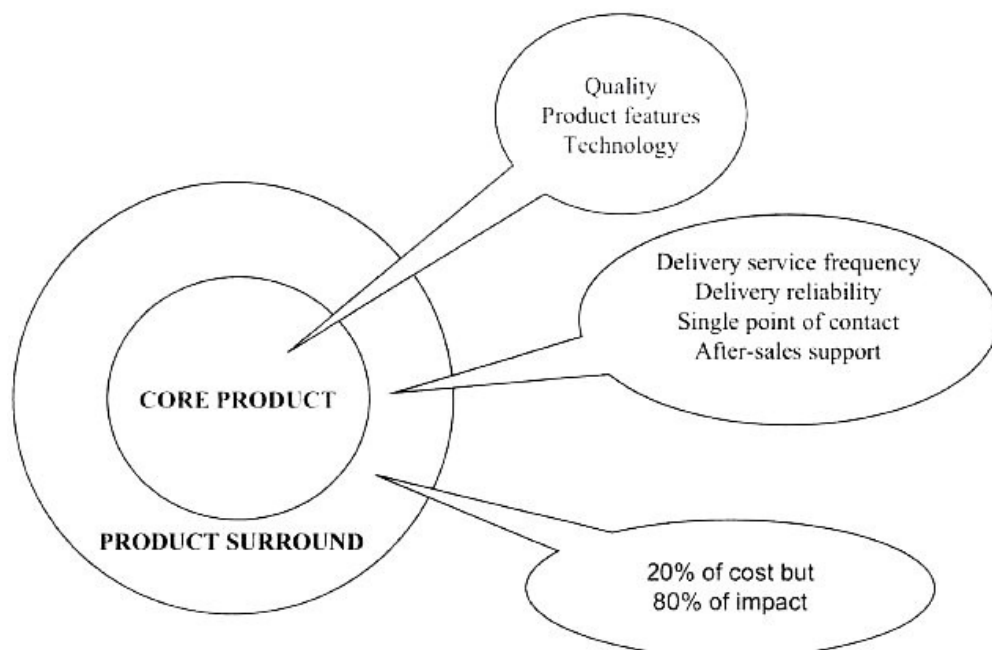


FIGURE 4. Core products versus product "surround", illustrating the importance of the logistics-related elements (Rushton et al. 2006, 63)

It is recognized by the marketing departments of many companies that the product surround elements are very important in determining the final demand for a product. In addition, these aspects often represent only a small percentage of the cost of a product. Thus, true to the Pareto 80/20 rule, it is estimated that product surround or logistics elements represent about 80 per cent of the impact of the product but only represent 20 per cent of the cost. Thus, no matter how attractive the product may be, it is essential that the customer service elements are satisfactory and, as we shall see, logistics plays a crucial role in providing good customer service. (Rushton et al. 2006, 34.)

3.3.1 Customer care versus customer service

While some authors distinguish between customer care and customer service, Donaldson (1995) considers them to be the same and defines them as all those activities provided by the seller which have value for the buyer thus increasing customer satisfaction and encouraging patronage and loyalty between the parties (Baker 2007, 457).

According to Baker (2007, 456) in its widest sense, customer care embraces everything an organisation does to establish and sustain a relationship with its customers. In its narrow sense, it is any activity or action which adds value to the relationship so that an organisation's customer care programme may consist of a listing of a series of highly specific activities.

3.4 The role of logistics in the customer service

Because customer service standards can significantly affect a firm's overall sales success, establishing goals and objectives is an important senior management decision. Distribution is closely related to customer service, so the outbound

logistics department plays an important role in the establishment of customer service goals and objectives. (Johnson et al. 1999, 113.)

Christopher et al. (1979) claim that customer service is part of the total market offering of the firm and that service is perceived asymmetrically; good service is expected as a normal concomitant of business relationships; weak service becomes a highly visible negative signal (Baker 2007, 471).

Customer service is inextricably linked to the process of distribution and logistics. Within this process, there are many influences that may be relevant to customer service. These range from the ease of ordering to stock availability to delivery reliability. Finally, there is the need to balance the level of service provided with the cost of that provision. The downfall of many a service offering is often the unrealistic and unrecognized high cost of providing a service that may, in the event, be greater than is required by the customer. (Rushton et al. 2006, 33.)

Christopher et al. (1979) argue that customer service is directly concerned with relationships with market intermediary firms, rather than to final customer (Baker 2007, 472). According to Baker (2007, 472) the need of the intermediaries in the distribution channel must be given specific attention, for they may well differ radically from the needs of the final customer and call for distinct services policies for each.

Finally, Christopher et al. (1979) draw an important distinction between the short- and long-run implications of customer service. In the short-run service failures may result only in lost orders due to stock-outs, or to reduced margins because of the need to replace defective parts or offer compensation. In the long-run, repetition of such failures can put the whole organisation at risk, as customers switch to alternative sources of supply. Conversely, careful attention to service in the short-run can be a powerful force in developing habitual buying behaviour and customer inertia (Baker 2007, 472).

4 BRAZILIAN FORESTRY INDUSTRY

According to FAO (2004), forest is defined as land spanning more than 0.5 ha with trees higher than 5 meters and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.

Forests in Brazil cover approximately 524 million hectares (61.5% of its territory) of natural and planted forests – which makes it the second largest forest area in the world, only surpassed by Russia. Circa 60.7% of Brazil's total area is covered with native forests, in other words 517,088,567 ha. (MMA 2009.)

Brazilian forests fulfil important social, economic and environmental functions through a variety of goods and services they provide at national and global level. While comprising 61.5% of the Brazilian territory, they are distributed in biomes whose particular characteristics also determine their contribution on a local scale, providing shelter for wildlife and contributing to water resource conservation; biodiversity and soil conservation; production of timber and non-timber products; climate stability; and a range of cultural values. (MMA 2009.)

4.1 Forestry industry economic importance

Brazilian agribusiness is carried out by two main activities: silviculture and plant extractivism together with related activities. Silviculture is defined as the care and cultivation of forest trees, i.e. forestry. Such practice aims at controlling the establishment, growth, composition, health and quality of forests to meet diverse needs of the many landowners, societies and cultures. The name comes from the Latin *silvi* (forest) + culture (Britannica 2010).

Bacha (2009) states that the Brazilian agribusiness is made up of three segments: upstream and downstream industries and plant extractivism. Upstream industries process the basic or raw material into an intermediary product, which is converted

into finished product by the downstream industries (Business dictionary 2010). The upstream segment is composed of producers of industrial equipment and supplies, as well as other service providers for extractivism and forestry. Downstream industries are closer to the point of sale than to the point of production or manufacture.

Plant extractivism is a sub-sector of agriculture that has received considerable international attention, due to its alleged potentials for promoting the sustainable use of tropical forests and other natural ecosystems, e.g. through the harvesting of non-wood products in extractive reserves. (Wunder 1999.)

Forestry production comprises the exploitation of both native and planted forests. From either forest one can obtain wood products (firewood, charcoal, timber) and non-timber products (leaves, roots, gums, fruits and environmental services). These products are transformed by the downstream industries or directly sold to the final clients. Increasing demand of wood and pressing needs for cutting costs can be cited as the most important reasons for the mechanization of forestry activities. (FAO 2004.)

In 2008 the whole world was affected by an economic crisis that started in the third quarter of that year, which is considered as the most serious crisis in capitalism since 1929. As worldwide production levels declined drastically in a very short period of time, there was an overall reduction in demand that led to cuts in employment levels and consumption that were felt in all countries.

The economic crisis impacted the economies of developed and underdeveloped countries. Brazil was not an exception to the rule; in fact such a crisis contributed to slow the country's economic expansion cycle at a time of increasing investments in expansion of production capacity.

There were pauses in investments, which intensified the decline in the production and consumption level. GDP in the first quarter of 2009 dropped 0.8% over the last quarter of 2008, which had dropped 3.6% in relation to the previous Quarter.

Thus, Brazil recorded, in the second quarter of 2009, its first recession since 2003. (ABRAF 2010, 40.)

The effect of the global crisis in the forest sector took place in different forest segments, through a pause and reduction of intended investments in planted forests and new industrial processing. This fact led to the reduction of annual planting, acquisition and mergers of the pulp and paper sector and wood-based panel companies, exports reduction in all sectors, besides production level decrease and shutdown of mechanically-processed timber companies. At the sectoral level, the most affected sectors by the global crisis were wood and charcoal-based iron industry, especially pig iron producers or independent iron and steel industry. (ABRAF 2010, 41.)

Globalization has had a significant impact on forest- and forest industry-based development worldwide. It has brought about increasing international trade in forest and forest industry products, launched new diversified and value-added products, promoted advanced technologies, accentuated requirements for human resource development, and witnessed a substantial amount of company mergers and acquisitions. These effects, together with other economic forces, will affect the competitive positioning of the different producing regions in the future. (Bonita, Correa, Veijalainen & Ahveninen 2002, 4.)

According to the Ministry of Agriculture, Livestock and Supply – Secretariat of Agribusiness International Relations (SRI/MAPA), the total Brazilian exports reached US\$197.9 billion in 2008 and the agribusiness export figure was US\$ 71.8 billion, which represents a growth of 22.9% compared to 2007. Forestry exports alone accounted for 3% of total Brazilian exports in 2008. Wood products exports from planted forests reached US\$ 6.8 billion compared to US\$ 5.8 billion in 2007. The agribusiness had a trade surplus of approximately US\$ 60.0 billion in 2008. Wood products that are part of the agribusiness sector contributed significantly to this favorable performance (ABRAF 2009, 74).

In 2009, Brazil's total exports reached US\$ 153.8 billion, representing a significant decrease of 23% compared to 2008 (US\$197.9 billion). This slowdown of the country's international trade was due to direct impacts of the global financial crisis and the appreciation of the Brazilian Real against the US dollar during the period. (ABRAF 2010, 83.)

In 2009 Brazilian exports of planted forest products totalled US\$ 5.6 billion, a decrease of 18% compared to US\$ 6.8 billion exported in 2008. On the other hand, the planted forest sector accounted for 4% of Brazil's total exports, while in 2008 it was 3%. This is due to the fact that the planted forest sector reduced its exported volume in proportions lower than the reduction of Brazil's total exports (ABRAF 2010, 83).

The Organization for Economic Cooperation and Development (OECD) estimates for 2010 global economic growth and states that the major developed economies got way out of recession risk already in the third quarter 2009. Brazil, according to OECD, foresees approximately 4.5% growth per year in 2010 and 2011. The official projection of the Central Bank of Brazil for the economic growth in 2010, forecasts that household consumption may expand by 6.1% in 2011, and gross fixed capital (investment level), will have a strong recovery, with an estimated 15.8% increase compared to 2009. (ABRAF 2010, 41.)

4.2 Productivity of Brazilian planted forests

The productivity of the Brazilian forest plantations has been increasing. In addition to environmental factors favouring forestry, new technologies are being used to enhance productivity, such as the genetic manipulation of seeds and the cloning of forest species. Such improvement makes Brazil stand out in forest productivity for both softwoods and hardwoods. (MMA 2009, 23.)

The result of these technological interventions go beyond productivity gains, increasing raw materials quality (wood and fiber), optimizing lignin content, pulp

yield, wood density, calorific value, tyloses, ash content, and other characteristics of interest of each wood processing sector, increasing industrial output and final product uniformity, industrial installations, equipments and industrial processes, and significant economic results. (ABRAF 2010, 64.)

In Brazil, planted forests are ready for felling from 12 and 14 years; eucalypt trees are ready for cutting between 5 to 7 years, while in temperate climates it can take up to 50 years. Eucalypt wood productivity in Brazil is about 41 m³/ha/year, while in Chile it is 25 m³/ha/year; in Uruguay it is 25 m³/ha/year and in Finland it is 4 m³/ha/year.

There is also high productivity of planted pine wood in Brazil is 37 m³/ha/year compared to other countries with strong tradition in planted forests: 22 m³/ha/year in Chile; 10 m³/ha/year in the USA (Southeast); 3.5 m³/ha/year in Sweden and 2.5 m³/ha/year in Canada.

4.2.1 Planted forests with eucalypt and pine

In 2009, the total planted forest area of eucalypt and pine in Brazil reached 6,310,450 ha, a 2.5% increase over the total in 2008, considered modest compared to the average annual growth of 5.5% during the period 2005-2008. The eucalypt forest area is expanding quickly in most Brazilian states with tradition in silviculture of these tree species, or in states considered new frontiers of silviculture, with an average national growth rate of 7.1% per year between 2004 and 2009. (ABRAF 2010.)

On the other hand, the pine planted area has been declining gradually in Brazil since 2007 (with a drop of about 37 thousand hectares in 2009 in relation to the previous year). While eucalypt planted area presented an expansion of over 1 million hectares over the past 5 years, the pine planted forest area remained stable, and the total area in 2009 almost back to 2004 levels, with a growth of just 1.7% in the period. (ABRAF 2010.)

One of the main characteristics of the pulp and paper industry is that it demands extensive forest plantations in comparison to other industrial segments. Not surprisingly pulp and paper companies are the biggest private investors in the Brazilian forestry sector. Figure below shows area and distribution of planted forests in Brazil:

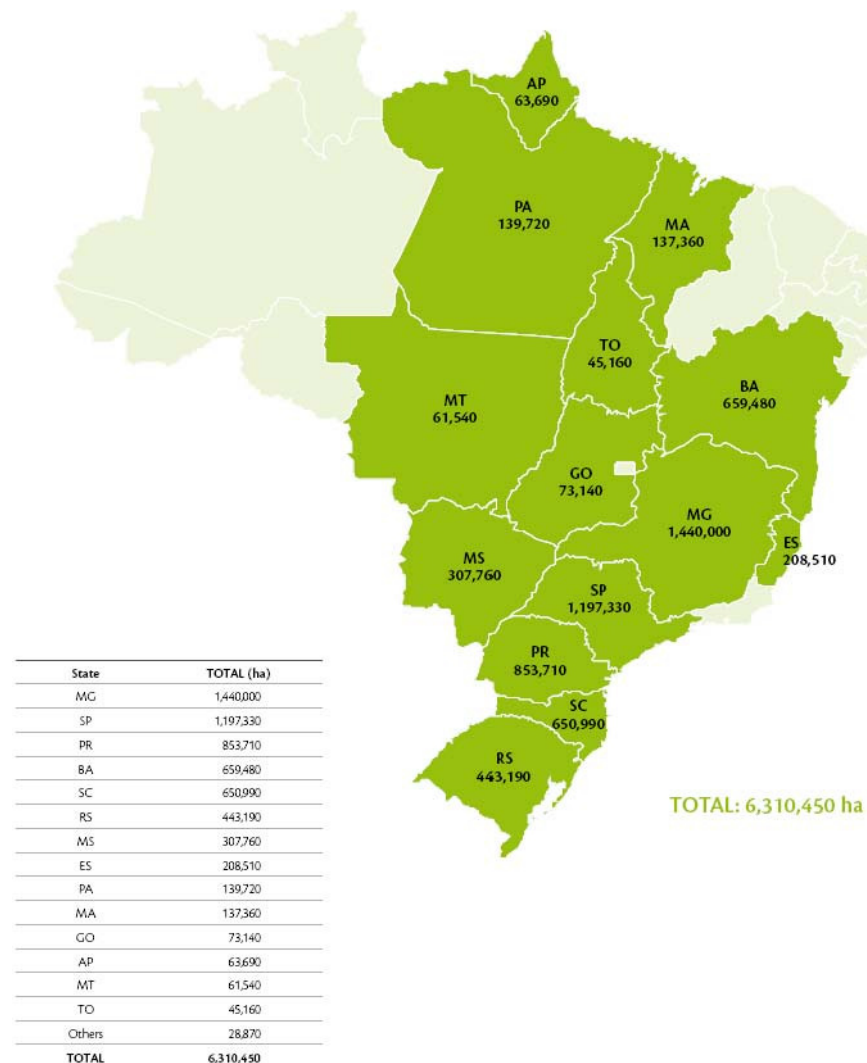


FIGURE 5. Area and distribution of planted forest in Brazil in 2009 (ABRAF 2010, 29)

As mentioned previously, the total area forested with eucalypt and pine for industrial consumption amounts to 6,310,450 ha, of which a total area of

3,596,350 ha belongs to the pulp and paper companies, as shown in the figure above.

4.2.2 Planted forests with native and other non-native species

Besides eucalypt and pine there are six different non-native species of trees planted for commercial use Brazil whose growth area and commercial importance are on the rise. Native species are *Hevea brasiliensis* (also known as rubber tree), Paricá and Paraná pine. Non-native species are Wattle, Teak and Poplar.

The Rubber tree (*Hevea brasiliensis*) is a native specie from the Amazon rain forest, which is planted in extractive reserves and commercial plantations to produce latex (natural rubber). The tree itself is logged once the latex production cycle ends. In 2009 total planted area in Brazil was 128,460 ha.

Paricá (*Schizolabium amazonicum*) is native specie from the North of Brazil used to produce toothpicks, furniture, plywood and veneer. It is also considered as potential timber in pulp production due to its natural suitability for delignification of the unbleached pulp process and for producing high resistance bleached paper (ABRAF 2010). In 2009 total planted area in Brazil was 85,320 ha.

Paraná pine (*Araucaria angustifolia*) is indigenous to South and Southeast of Brazil. It has a high quality wood that is used in civil construction, flooring and decks, furniture industry and shipbuilding. In 2009 total planted area in Brazil was 12,110 ha.

Wattle (*Acacia mangium* and *Acacia meamsii*) is used in tannin extraction and wood production (charcoal, wood chips, wood panels), besides that, it is used for recovery of degraded areas. In 2009 total planted area in Brazil was 174,150 ha. This kind of tree is also regarded as a source of direct and indirect jobs, as it is often planted in small farms.

Teak (*Tectona grandis*) is used in shipbuilding, civil construction, furniture industry, flooring and decks. In 2009 total planted area in Brazil was 65,240 ha.

Poplar (*Populus* spp.) is mostly used in the production of matches, toys, kitchenware, doors and furniture parts. In 2009 total planted area in Brazil was 4,030 ha.

4.3 Forest products market

The Brazilian forest sector provides various products to society such as wood and non-wood ones. Besides that, the sector has a high forest productivity that goes along with a sustainable utilization of the country's forest and low impact logging practices. The result is that the Brazilian forest sector sustains biodiversity and provides environmental services. Forest products are divided into wood and non-wood forest products shown in the flowchart below:

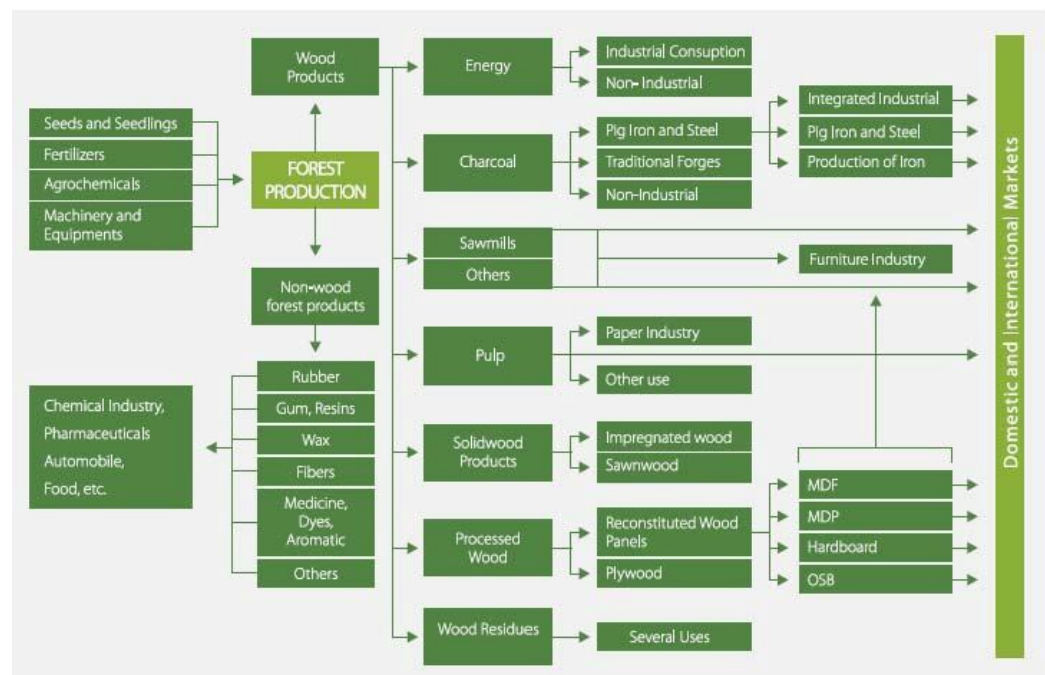


FIGURE 6. Wood production flowchart (ABRAF 2009, 65)

The wood production chain is based on the silviculture of planted forests that begins with the planting of commercial tree species, forest management and tree harvesting. The industrial wood processing is divided into primary, secondary and tertiary phases.

The primary processing refers to log transformation into a number of products such as sawnwood, chips, charcoal and energy. These products are the basis for processing secondary and tertiary forest products before reaching the final consumers in the domestic and international markets (ABRAF 2009, 70).

The secondary phase is the processing of primary products into final or intermediate products. From sawnwood one obtains beams, rafters, treated wood and so on. Also in this phase wood chips are used to produce Medium Density Particleboard (MDP), Medium Density Fiberboard (MDF) and Oriented Strand Board (OSB). Furthermore, wood chips are used in the production of pulp. Combined with tree bark they are transformed into energy. Other products resulting from the secondary phase are reconstituted wood panels, charcoal for the pig and steel industry and plywood.

Wood residues such as bark, slabs, sawdust etc are generated during the entire industrial process, from the harvesting to final product processing. These residues are used to produce electrical and thermal energy for various purposes, e.g. in the grain drying process, wood pallets manufacturing, burnt in furnaces for generation of hot gas or heating fluids and in the pulp industry.

Solid wood is the basis for the manufacturing of high value-added wood products such as blocks, blanks, doors, staircases, flooring, window frames etc. The tertiary process adds the highest economic value to solid wood products.

Tertiary processing includes a combination of primary and secondary products, with intermediary applications in various industrial processes, increasing the range of manufactured products significantly. The most common are wood materials for civil construction, furniture parts and packaging, paper and cardboard production.

Products for the final consumer follow a sequential cycle in the wood production chain, with highly diversified and specialized products (furniture, wood housing, special papers and woodworks in general).

Non-wood forest products also contribute to the development and revenue generation to the sector, offering a wide range of products, such as resin, rubber, gum, aromatic and medicinal products etc.

Pulp and paper:

Consumption of pulp and paper consumption is considered a major parameter of economic performance and industrial activities of countries. The global financial crisis that started in 2008 caused a drop in pulp prices throughout the first half of 2009. Pulp prices registered a slight recovery upwards starting on the second half of 2009. Despite such problems, Brazil became the fourth largest pulp producer in the world in 2009, surpassing traditional producers like Finland and Sweden.

In 2009 there was a growth of 6% in pulp production compared to the previous year, totaling 13.4 million tons, in accordance with the annual upward growth trend between 2000 and 2008. There was a reduction in the internal consumption of pulp of 6.5% compared to 2008. Overall, Brazilian pulp production is sufficient to attend domestic market and also to expand market share abroad as production can grow with the expansion of existing plants and the establishment of new ones. There are 220 companies producing pulp and paper in Brazil, whose exports in 2009 reached US\$ 5 billion. These companies own 2.2 million of hectares of planted forest area for industrial use.

Brazilian paper production remained stable in 2009 compared to 2008, totaling 9.3 million tons produced. Domestic paper consumption decreased 6.5% in 2009, totaling 8.4 million tons, breaking up the upward trend since 2003. The forecast for the next few years are promising, because the expectation of the forest-based industry is to reach levels achieved before the crisis, increasing the consumption of paper products, especially packaging, such as corrugated cardboard. (ABRAF 2010, 80.) Nowadays there are 220 companies producing pulp and paper in Brazil,

whose exports in 2009 reached US\$ 5 billion. These companies own 2.2 million of hectares of planted forest area for industrial use.

The recovery of global demand for paper, the increase in domestic supply and the forecast of appreciation of the US dollar in relation to other currencies, help support the prediction that 2010 will be promising for domestic companies of the paper and pulp industry. The sales volume of paper in the world may grow 12% to 15% in the first half of 2010, benefiting the producers of pulp and paper. (ABRAF 2010, 42.)

Charcoal-based iron and steel industry:

The main clients of charcoal-based pig iron producers are the iron and steel industries, whose downsized activities deeply affected the segment of charcoal-based pig iron production. The reduction of both domestic and foreign demand was the main culprit for the production fall of 4.3 million tons in 2009 compared to 8.3 million tons in 2008.

In 2009 internal consumption of charcoal was approximately 22 million MDC (meter of charcoal), a number 33% smaller than in 2008. On the other hand, there was an expansion of charcoal use from planted forests due to increasingly strong demand from end consumers of steel products, who oppose the use of charcoal from natural forests. Therefore, the use of planted forests for charcoal production will demand an increase in forestation area to attend the industry needs.

In 2009, Brazil exported 6.4 million tons of charcoal, equivalent to US\$ 2.2 million. Although the share of charcoal in the Brazilian exports is reduced, the charcoal-based iron and steel industry export significant amounts of pig iron produced through the industry (ABRAF 2010, 85).

Reconstituted wood-based panels:

The demand for wood-based panels, whose largest consumer is the furniture sector, dropped after September 2008. Consequently, the sector was troubled by weak demand and for reconstituted wood-based panels due to the global economic

crisis. The difficulties in the sector hit bottom in the first half of 2009, with a 30% drop in exports of different types of reconstituted panels in relation to the same period in 2008 and a 20% reduction in sales to the domestic market. The market for reconstituted wood-based panels is destined for domestic consumption, supplying the demands of specific sectors (ABRAF 2010, 43).

Furniture sector:

This sector was badly hit by the global financial crisis as it depends heavily on exports. As sales in the international market dropped, many countries took advantage of the bleak scenario to reinforce or impose protectionist barriers, the sector as a whole faces very few options other than focus on the domestic market and makes the best use possible of some tax exemption in order to foment furniture sales and regain the local consumers' preference.

Mechanically-processed timber:

The performance of the processed timber segment, mainly plywood and sawnwood was also strongly affected by the global financial crisis. In spite of that, the sector is quite confident that it can overcome the crisis by diversifying export destinations and by investing in the domestic market, which is supposedly going to experience a surge in civil construction developments because the country is going to be the host of the World Cup Soccer in 2014 and the Olympic Games in 2016.

Pine plywood domestic consumption increased 8.6% in relation to 2008, totaling 604 thousand m³, due to a growth in civil construction, which uses wood products, including plywood. The domestic production of pine sawnwood reduced 1% compared to 2008, totaling 7.77 million m³. This reduction was due to the impacts of economic recession that affected the forest product market, combined with the loss of competitiveness due to unfavorable exchange rate. (ABRAF 2010, 80.)

Roundwood production and consumption:

In 2009, the production of sustainable forest roundwood in Brazil, from eucalypt and pine planted forests, reached an estimate of 250.3 million m³ / year. The

sustained production of a species is the potential growth from the multiplication of the planted area and its Mean Annual Increment (MAI). Between the two main tree species planted, eucalypt represents 73% of the total sustained log production while pine accounts for 27%. (ABRAF 2010, 73.)

In 2009, the sustained production of eucalypt roundwood was concentrated in the Southeast (56%) followed by Northeast (17%) and South (12%). As for pine, the sustained roundwood production was mostly concentrated in the Southern (79%) and Southeast (17%). This fact was due to the development of the timber industry in these regions, mainly involved manufacturing of conifer sawnwood, plywood and reconstituted wood-based panels. (ABRAF 2010, 73.)

In 2008, annual roundwood production from planted forests for industrial use totaled 164.7 million m³, out of which 61.5% were industrial roundwood and the remaining was firewood (25.5%) and charcoal (13%). For 2009, the estimate was that the annual roundwood production for industrial use declined compared to 2008, reaching 160.8 million m³. (ABRAF 2010, 74.)

The main consumers of log are large forest companies in the following segments: pulp and paper, reconstituted wood panels, timber industry, charcoal and industrial fuelwood, as seen in the figure below:

TABLE 1. Roundwood consumption from planted forests for industrial use in Brazil by segment and species (ABRAF 2010, 76)

Segment	Roundwood consumption (thousand m ³)			Roundwood consumption (thousand m ³)		
	2008			2009 ²		
	Eucalypt	Pine	TOTAL	Eucalypt	Pine	TOTAL
1. Pulp and Paper	48,395	8,601	56,996	52,545	8,086	60,631
2. Reconstituted Wood Panel	3,278	6,078	9,356	2,872	6,520	9,392
3. Timber Industry ³	3,282	29,543	32,825	3,093	27,463	30,556
4. Charcoal	21,385	0	21,385	19,388	0	19,388
5. Industrial Fuelwood	33,537	9,691	43,228	32,363	9,347	41,710
6. Others ⁴	876	19	895	895	7	902
TOTAL (Silviculture)	110,754	53,931	164,685	111,156	51,423	162,580

As shown in the figure above, Brazil consumes all of its production of roundwood from planted forests, whereas import and exports of roundwood from planted forest are negligible. It is estimated that in 2009 some 162.6 million m³ of roundwood from planted forests were consumed.

4.4 Attractiveness of investments in planted forest

Forest plantations are, generally, driven by wood consuming companies. Some companies in search of new frontiers are investing in non-traditional states in forestry, under the state government support, including Piauí, Maranhão, Mato Grosso do Sul and Mato Grosso in West-central region, and expansion of planted forests, to a lesser extent, in Pará (North). Planted forest expansion also occurs in states with tradition in silviculture. (ABRAF 2009, 42.)

In 2008, Brazil was upgraded from speculative grade to investment grade in the credit rating index of the Standard & Poor's, which allows a country to capture external resources at lower interest rates (low risk premium of debt securities). (ABRAF 2009, 41.)

Besides this classification, Brazil shows attractive factors for foreign investors, including the possibility of access to a broad and growing consumer market and greater political stability. In times of international economic crisis, shortage of external credit offers and low investments, Brazil has become an alternative to business groups that still have greater liquidity and are ready to invest. The comparative and competitive advantages of the country in the forest sector, especially with fast-growing plantations guarantee high return to investors. (ABRAF 2009, 41.)

4.4.1 Financing mechanisms to the planted forest sector

Financing mechanisms have been traditionally strengthened, to a greater or lesser degree, different segments of the economy, including the planted forest sector in Brazil. The public and financing mechanisms, including bank credit lines to the sector, promote the expansion and development of the planted sector. The high initial capital required for the establishment of the forest, purchase of inputs, seedlings, and equipments is provided by financing mechanisms. (ABRAF 2010, 92.)

Despite the existence of different financing mechanisms for the establishment of planted forests, from public and private sources, the private sector, through its direct investments, domestic or foreign, is largely responsible for the current level of investment in planted forests in Brazil. However, the government plays an important role, through various public institutions, in providing funds for investmentsto suit different types of investors and as a facilitator of credit lines, including large-scale investment projects in forest and industry, such as those of the pulp and paper sector. (ABRAF 2010, 92.)

4.4.2 Forest outgrower scheme

The outgrower scheme has been promoted by many companies as an alternative to supplement their wood supply from planted areas, through the establishment of partnerships with small and medium-size landowners, in regions where these companies develop their businesses. Simultaneously, the forest outgrower scheme allows promoting the expansion of forests, contributing to the regional development. (ABRAF 2010, 105.)

We define an outgrower scheme as a contractual partnership between growers or landholders and a company for the production of commercial forest products. Outgrower schemes or partnerships vary considerably in the extent to which inputs,

costs, risks and benefits are shared between growers/landholders and companies. Partnerships may be short or long-term (e.g. 40 years), and may offer growers only financial benefits or a wider range of benefits. Also, growers may act individually or as a group in partnership with a company, and use private or communal land. Outgrower schemes are usually prescribed in formal contracts (FAO 2001.)

Already in the early 80's, companies that own planted forests realized the importance of adopting a different approach to forest ownership, more specifically that they no longer had to maintain control of 100% of forest assets needed to supply their factories. Instead, they started investing in forest outgrower schemes in areas closely located to their mills. The 80's were troubled times for Brazil, plagued with deep economical problems, frequent currency devaluations and high inflation that contributed to the slow take-off and lack of confidence in forest outgrower schemes (Klabin 2010).

A decade later, as the country's economy stabilized and inflation gave its last sigh, the pulp and paper industries investments in the forest outgrower schemes finally proved worthwhile. The level of commitment between small and medium-size non-industrial forest owners and the traditional investors in planted forests was noticeably improved to such an extent that, several investors set long range targets to ensure that 70% of wood supply would come from own forests, giving partners a significant margin of up to 30% to increase their wood production (Klabin 2010).

The volume of wood harvested under such agreements is considerably lower than in larger sites, therefore it is a sine qua non condition that the distance between the farm and the mill does not exceed 100 kilometers. The farmer is usually responsible for harvesting the trees and delivering them to the mill yard (Klabin 2010).

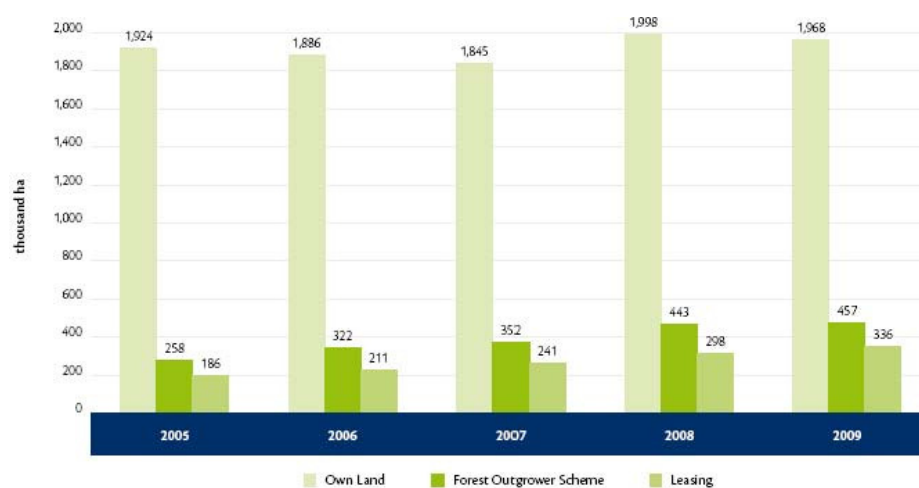
For small and medium-sized producers, a forest outgrower scheme is an opportunity of new source of income (main or additional source), guaranteeing their production sale through wood purchase and sale contracts with promoters of

the outgrower scheme program, with high profitability and at a low risk since in most cases the company take in part of initial costs, making seedlings donation, inputs and providing technical assistance. From the social point of view, a forest outgrower scheme improves income distribution and assists to fix the rural populations, creating permanent jobs, due to forest rotation, and contribute in the economies of the municipalities involved. (ABRAF 2010, 105.)

Unfortunately, access to credit is very difficult in Brazil, if one is not well-off and actually needs the financial support to carry out industrial activities (FAO 2005). The combination of red tape and skyrocketing interest rates (see Appendix 3) as high as 10.75% year or, even worse, “set according to the type of operation”, is lethal to entrepreneurship. Not surprisingly, the volume of public disbursement of some of the financial programmes offered by the Brazilian government amounts to zero.

Therefore, forest-based industries need not only to encourage the planting of trees by commercial farmers, but also underwrite the financing for such producers (ABRAF 2009). In short, forest outgrower schemes have three participants: a commercial producer, an underwriter and a lender. In this model the commercial producer receives a loan from a bank (the lender) and pays his the debt in wood (total or partial production) to the underwriter (forest-based company). The underwriter is responsible for paying off the debt to the bank (Klabin 2010).

This growing trend in the change of ownership of planted forests in Brazil has two major effects in the production chain: (1) boosts the diversification of the forestry industry and (2) incorporates timber production to traditional activities of rural properties (Veracel 2010). The figure below shows the growing trend of outgrower schemes:



Growth Rate (%)	2005	2006	2007	2008	2009
Own Land	-	-2.0%	-2.2%	8.3%	-1.5%
Forest Outgrower Scheme	-	24.8%	9.3%	26.0%	3.0%
Leasing	-	13.4%	14.0%	24.1%	12.4%

FIGURE 7. Trend in eucalypt and pine planted forest areas by property type (ABRAF, 2010, 34)

As shown in the figure above, planted forests on own land remained practically stable between 2005 (1,924,000 ha) and 2009 (1,968,000 ha), while forest outgrower schemes increased significantly between 2006 and 2008, though the effects of the global financial crisis are reflected in the numbers from 2009.

4.4.3 Public funding

The main financing mechanisms from public funds for the forest sector are operated by federal banks (e.g. BNDES), through funds transferred by the Union budget and the Ministry of Agriculture, Livestock and Supply (MAPA) and the Ministry of Agrarian development (MDA), as per Appendix 2 (ABRAF 2010, 95).

In addition to financing mechanisms mentioned above, the Constitutional Funds, administered by the Ministry of National Integration (MIN), are destined to finance various sectors of the economy, such as the Constitutional Fund for Financing the North (FNO); Constitutional Fund for Financing the Northeast

(FNE) and the Constitutional Fund for Financing of the Central West (FCO), as shown in Appendix 3 (ABRAF 2010, 95).

5 TIMBER HARVESTING METHODS

The use of terms such as “harvesting” and “logging” can be misleading and even controversial mostly because different authors give them slightly different meanings. Wellburn (2010) defines forest harvesting as a process of cutting trees and delivering them to the forest sawmills, pulp mills and other wood-products processing plants. It includes forest engineering, forest road construction, logging and log transportation.

According to The Encyclopædia Britannica (2010), logging is the process of harvesting trees, sawing them into appropriate lengths (bucking) and transporting them (skidding) to the sawmill. The different phases of this process vary with local conditions and technology.

Runesson (2009) provides a more straightforward definition of forest harvesting: the practice of felling and removing trees or the removal of dead or damaged trees from an area. It seems that the both terms are interchangeable; therefore in this paper both options are used.

5.1 Harvesting plan and methods

Forest harvesting is a sequential process that involves not only the physical act of felling a tree, but that actually initiates with a harvesting plan. A harvesting plan is a complex operation that includes decisions such as which forest areas to harvest, when to harvest them, which harvest crew to use in the area and the exact amount of assortments to distribute from the forest area to the mill (Souza 2005).

The productivity of worked hours per day is the main determinant for the payment of salaries; therefore operational efficiency is a critical point. A harvesting plan usually consists of two parts: a preliminary assessment and a comprehensive plan. The preliminary assessment provides an overall view of the forest area, soil and possible hazards such as steep slopes that make the harvesting operation unsafe for the workers and causes difficulties to access the harvesting area.

A comprehensive harvest plan includes the schedule of activities; road recommendations; the amount and species of timber volumes to harvest; spatial distribution of the forest; detailed topography; the type of cut to perform (individual tree selection, row thinning, clear cut etc) among other information.

A harvesting method refers to the form in which wood is delivered to the sideroad and the amount of wood processing (e.g. debarking, delimiting, bucking, chipping) which is made in the stump site. Forest harvesting activities are carried out all over the world, in some cases using traditional manpower and in others via mechanized methods. The most common mechanized forest harvesting methods in use are tree-length and cut-to-length. Full tree harvesting method is a manual one that requires the use of a chainsaw for the felling of the tree.

Full tree means that the tree is felled and transported to the roadside with limbs and tops intact. On the roadside the tree is delimited, topped and hauled to the mill or bucked (cut to predetermined lengths) to obtain chips, pulpwood or logs.

Tree-length means that the tree is harvested, delimited and topped at the stump. The trunk is transported to the mill whole or almost whole; at the mill, trunk pieces are assorted according to use: sawlogs, pulpwood, veneer etc (Ponsse 2010).

Cut-to-length means that there is one single process in the felling area: the tree is harvested, delimited, bucked and transformed into various assortments: pulpwood, sawlogs, etc.

About 55% of the world's wood harvest is harvested manually, e.g. with a chainsaw. The remaining 45% is harvested mechanically, using either the cut-to-length or tree-length method (Ponsse 2010.), as shown in the figure below:

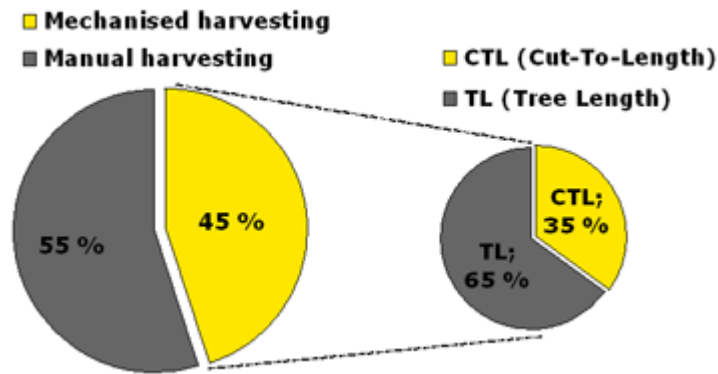


FIGURE 8. Wood harvesting throughout the world (Ponsse 2010)

As seen in the figure above, of the mechanically harvested portion, about 65% is harvested using the tree-length method and the remaining 35% using the Nordic cut-to-length method. This means that about 16% of the world's total wood harvest is obtained using the cut-to-length system. (Ponsse 2010.)

5.2 Machines used in forest harvesting

The full tree method harvesting machines are a chainsaw powered by gasoline, hydraulic or electric motor: A skidder pulls the tree out of the forest to the processing area, where delimiting equipment is used to saw the branches of the felled tree. Strike delimiters, pull-through delimiters and delimiting gate are examples of mechanized delimiting equipment. Small chainsaws are used for manual delimiting. Chainsaws or slashers are used to cut the log into desired sizes.

In the cut-to length method two machines are needed: a harvester and a forwarder. The harvester fells, delimits, measures and cuts the trunks into timber assortments

for the final user. The forwarder performs the short-distance hauling of the separately batched timber assortments to the roadside (Ponsse 2010).

Correspondingly in the tree-length method the harvesting machine stock consists of a feller machine that fells the trunks, a ground skidding tractor that drags the intact trunks to the roadside, as well as a delimber that strips the trunks and cuts off the tops of the trees. Often at the roadside a cutting unit is also required if the trunks are so long that they have to be cut into, for example, 3 sections for long-distance transport. ((Ponsse 2010)

5.3 Cut-to-length method: main advantages for the user

Machinery:

Compared to the tree-length method's equipment the cut-to-length logging method's machines are technologically more advanced and consequently more expensive. On the other hand the tree-length method requires more machines. Compared to the tree-length method's overall machine costs, the cut-to-length logging method is often slightly more expensive. ((Ponsse 2010)

Fuel consumption:

The cut-to-length logging method's fuel consumption per harvested cubic meter of timber is significantly less than in the tree-length method because there are fewer machines and typically the machines are lighter in weight. ((Ponsse 2010)

Salary expenses and overall harvesting expenses:

The cut-to-length logging method's salary expenses are also lower because fewer drivers are required. That being the case the overall harvesting expenses at the roadside for both methods are approximately the same, and will be affected by the actual harvesting conditions. Correctly implemented, the long-distance transport of logs to production plants can be managed much more cost-effectively and efficiently in the cut-to-length logging method than in the tree-length method. ((Ponsse 2010)

Logistics:

In the cut-to-length logging method, logs can be hauled directly to the sawmill, lathe logs directly to the plywood plant and pulpwood directly to the paper plant or pulp mill. For this reason the transport distances are shorter than in the tree-length method, where typically the entire trunk is first transported to the sawmill where the logs are unloaded and the parts suitable for sawing are removed from the trunks. Typically the leftovers, in other words the part that will become pulpwood, is pulverized into chips, loaded into trucks, and hauled to the paper plant or pulp mill. Thus there are more processing stages for the pulpwood in the tree-length method compared to the cut-to-length logging method. (Ponsse 2010.)

Additionally, the transport distance for pulpwood is almost always longer than in the cut-to-length logging method. In the cut-to-length method, round-trip transports can also be exploited. For example when the logs are hauled from the harvesting location to the sawmill, the same vehicles can transport pulpwood loads from the sawmill to the paper mill (Ponsse 2010).

6 CASE STUDY: PONSSE LATIN AMERICA LTDA

6.1 Ponsse Oyj company profile

Ponsse Oyj specializes in the sales, production, maintenance and technology of cut-to-length forest machines. Its operations are guided by a genuine interest in its customers and their business operations. The company develops and manufactures innovative harvesting solutions that follow the principles of sustainable development and are based on customer needs (Ponsse 2010).

The company was established by forest machine entrepreneur Einari Vidgrén in 1970, and it has been a pioneer of timber harvesting solutions based on the cut-to-length method ever since. Ponsse Oyj is headquartered in Vieremä, Finland. The

Company's shares are quoted on the NASDAQ OMX Nordic List. The Group operates in approximately 40 countries (Ponsse 2010).

Mission:

“We will succeed together with our customers and partners through innovative harvesting solutions based on sustainable development (Ponsse 2010).”

Vision:

“We are the preferred partner in our industry (Ponsse 2010).”

Ponsse Oyj business operations are focused in three main areas: forest machines (production of durable forest machines for mechanized cut-to-length wood harvesting and transportation), information systems (intelligent control and information systems for mobile machines) and services (after sales of spare parts, service agreements, technical support, training and documentation).

Ponsse Oyj's first operation area is the manufacture of cut-to-length forest machines, namely harvesters, forwarders, harvester heads, cranes and loaders. The company produces four models of harvester, six models of forwarders, one hybrid harvester that also performs as a forwarder, 10 types of harvester heads, four types of cranes and three kinds of loaders.

Harvesters are used for wood harvesting and forwarders for the transport of logs. As mentioned before, the hybrid vehicle is a two-in-one combination of a harvester with a forwarder. A harvester head is used for sawing the tree. Cranes and loaders are integrated in the harvesters and forwarders and use for operations of lifting and loading of logs.

Ponsse also manufactures attachments to forest machines. Attachment products enhance the usability of the forest machines and other machines to perform tasks such as brush clearance, soil tilling or the spreading of fertilizer, chalk or ashes. Attachment solutions also make it possible to use Ponsse Oyj products, such as harvester heads or loaders, with other manufacturers' forest and work machines. In

addition to selling new machines, Ponsse is a major seller of used machines in Europe, North America and Russia (Ponsse 2010).

Ponsse's second operation area is the manufacture of information systems used in logging operations. The basic principle of mechanized logging is "no foot on the forest floor", and to achieve such a goal it is necessary to use forest machines operated by a modern lumberjack, who no longer resort to the use of physical force. Instead of that, the lumberjack performs his duties seated in the machine cabin and deals with computerized systems in a safer and more comfortable environment (Ponsse 2010). Information system diagrams are shown in the figure below:

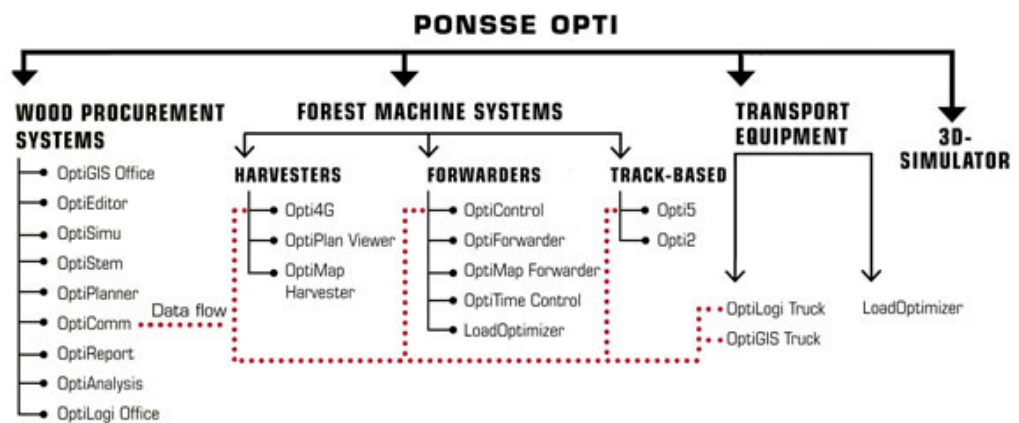


FIGURE 9. Software solution for the entire wood procurement chain (Ponsse 2010)

As seen in the figure above, Ponsse Oyj designs and manufactures all of the control and measuring systems needed for the wood procurement chain – from stump to plant. Opti information system products cover wood procurement management systems, forest machine information systems and transport equipment systems. To promote productive wood harvesting, Ponsse Oyj is also investing in the development of effective training technology (Ponsse 2010).

Ponsse's third operation area is services. Services are classified as follows: parts (spare parts and accessories), service agreements (preventive / maintenance care, full service, partnership), technical support (workshop, field / maintenance / remote service), training (operator / maintenance / process and operator), and documents (owner's / parts manuals).

As per 2009 the company had a total of 781 employees and net sales of EUR 146.7 million. The company's shares are quoted on the NASDAQ OMX Nordic List. The group operates in approximately 40 countries.

The Ponsse group consists of the parent company Ponsse Oyj and the subsidiaries Ponsse AB, Sweden; Ponsse AS, Norway; Ponsse S.A.S, France; Ponsse UK Ltd, Great Britain; Ponsse North America, Inc, The United States of America; Ponsse Latin America Ltda, Brazil; OOO Ponsse Russia; Ponsse Asia Pacific Ltd, Hong Kong; Ponsse China Ltd, China; Ponsse Uruguay S.A., Uruguay; Epec Oy, Seinäjoki, Finland. (Ponsse Annual Report 2009.)

6.2 Ponsse Latin America Ltda

Ponsse Latin America Ltda's new factory was inaugurated in May 2006. Ponsse wants to have a presence close to local customers and the largest cultivated forests in the world, and develop the most efficient harvesting solutions for the local conditions. Ponsse specifically wanted to place the factory in Brazil, where the forest industry has long traditions. (Ponsse Annual Report 2006, 34.) The Brazilian branch was also established to mark Ponsse Oyj's entry in the key Latin American markets, which are also the region's four most important harvesting countries: Brazil, Chile, Uruguay and Argentina (Ponsse Annual Report 2009, 17).

Originally, the Brazilian plant was intended to produce harvester heads to debark eucalypt. Harvester head product development also moved to Brazil. The company aimed at supplying demand from the pulp and paper mills expansion and from green field sites both in Brazil and Uruguay. Local production of harvester heads

in Brazil was part of the company's long-term plans for the Latin American market, and also worked as a proof of commitment. Local production was envisaged as a guarantor of price competitiveness and high quality of the products.

Back in May 2006, Ponsse Latin America Ltda inaugurated its new production plant, training centre and spare part storage which would serve the whole of Latin America. The company also signed a co-operation agreement with three major distributors, whose vast local presence would provide a national distribution base for Ponsse Latin America Ltda. In the same year, a training program for the company's own salespeople and network personnel was announced.

A testing and certification programme with key clients was launched. According to the company, this is a standard procedure in Latin America. Machines are usually used for about 5,000 hours per year, which is more than in most markets and undergo an extensive basic overhaul at four-year intervals (Ponsse Annual Report 2006, 34). The company obtained the approval and certification from all of the key pulp mills not only for the eucalypt harvester heads, but also to the Buffalo King forwarders (Ponsse Annual Report 2006, 34).

2007 was a very good year for Ponsse mostly due to sales in foreign markets, which accounted for 70.6% of the company's turnover. The first major deals were signed in Brazil and Uruguay (Ponsse Annual Report 2007, 9). In October 2007, Ponsse Latin America Ltda signed a sale deal for 67 harvesters and 44 harvester heads to Bahia Pulp, a Brazilian client part of the Asian RGM International Group. The deal also concerned related services and training (Ponsse Annual Report 2007, 12). Ponsse Latin America Ltda increased its local manufacturing capacity and worked hard to promote awareness of the Ponsse Latin America Ltdabrand in South America.

Already in 2007, the Brazilian branch claimed that the most important Brazilian pulp producers were using Ponsse forestry machines in harvesting operations, and also that Ponsse Latin America Ltda was the market leader in rubber-wheel harvesters in Latin America. Ponsse Latin America Ltda was the number two in

the forwarders market (Ponsse Annual Report 2007, 18). Though the company's annual report still mentioned the names and addresses of the three local distributors cited in the previous page, there was no further information about the development of the co-operation agreement between them and the Brazilian branch.

All in all, the outlook for 2008 was extremely promising. Forecasted growth was based on forestry investment and the production of harvesting machinery for new markets, such as the Brazilian one. However, the 2008 global financial crisis had a deep impact in the price of pulp, which registered a drop from US\$800/ton to about 450 US\$/ton in the third quarter of that year (Ponsse Annual Report 2008, 18). As the main pulp producers decided to cut production, the volume of tree felling was also affected, resulting in an alarming decrease of Ponsse Latin America Ltda's production and sales of both machinery and services. To add salt to injury, all greenfield site plans were postponed until further notice.

On the positive side, the Brazilian branch managed to successfully finalize negotiations with new important clients that are service providers to the pulp and paper mills. According to Ponsse Annual Report 2008 (2008, 18), starting in that year, clients could get maintenance services directly from Ponsse Latin America Ltda. In other words, the partnership with local distributors was called off. As the company's main clients adjusted production levels, Ponsse Latin America Ltda had no option but to find ways to focus on high efficiency and lower costs.

In December 15, Ponsse Oyj centralised both production and research and development operations in Vieremä, i.e. the assembly and product development of debarking harvester heads is to be carried out in Finland, while the Brazilian branch is solely responsible for sales and maintenance service network (Ponsse Annual Report 2008, 12). As for now, Ponsse Latin America Ltda focuses the sales of its machines to forest-based industries that own or lease planted forest areas.

Ponsse Latin America Ltda does not have machines in stock for sale, because they are produced and customized in Finland according to the clients needs, shipped by sea to be assembled in Brazil and delivered to the final client. Assembling means that tyres, harvester head and some other components are installed in the machine body. The company keeps a few machines to display in fairs and similar business events in South America.

In after-sales services, we continued to focus on customer specific solutions. Customised service agreements and other services ensure high productivity of our products and low operating costs. (Ponsse Annual Report 2009, 18.)

6.2.1 Overview of competitors present in the Brazilian market

Ponsse Oyj is a Finnish manufacturer of cut-to-length forest machines. There are several other producers of forest machines in the world, though not all of them are present in the Brazilian forest market. The ones present in Brazil have a long tradition in the manufacturing of forest machines, as well as an established brand and market share.

Ponsse's competitors present in the Brazilian forest market have two common features:

- The first one is that they manufacture tree-length and cut-to-length machines. Some of these companies are focused on the sale of tree-length machines in the Brazilian forest market. Some offer both technologies. Another common feature is that Ponsse Oyj's competitors offer credit lines to their Brazilian clients and seem to be reaching out for small and medium size wood producers (e.g. participants of forest outgrower schemes).
- The second one is that they are producers of agricultural and/or construction machinery and equipment, with well-established distribution

channels in the country. To many of Ponsse Oyj's competitors, the construction market was the primary reason for doing business in Brazil.

As for the use of distribution channels and the range of services offered, each company has its own unique way of positioning itself in the market. While some of Ponsse Oyj's competitors make use of local dealers' network in order to sell their harvesting machines in Brazil, others prefer to have their own personnel in charge of sales and distribution solutions.

As for training and maintenance, there are different approaches; some work with their dealers to sell both maintenance and training; others prefer to do it by themselves. Ponsse Oyj's main competitors in Brazil are Logmax, Caterpillar, John Deere and Valmet/Komatsu.

John Deere Ltda

Deere & Company, a.k.a. John Deere, is an American corporation based in Moline, Illinois. The company has a global presence in the forest and agricultural markets. Forest machine production sites are located in the states of Iowa and Illinois, as well as in some European countries. John Deere's presence in Brazil dates from early 90's under the trademark Timberjack (johndeere.com). The company manufactures both tree-length and cut-to-length forest machines, of which only the tree-length models are available for sale in Brazil. Consumer services are provided by the company's dealers.

John Deere consists of three major business segments (agriculture and turf, construction and forestry, and credit). Those segments, along with the support operations of parts and power systems, are focused on helping customers be more productive as they help to improve the quality of life for people around the world. The company's products and services are primarily sold and serviced through John Deere's dealer network, which also offers financial solutions. (John Deere 2010.)

Caterpillar do Brasil Ltda

In 1890 Benjamin Holt and Daniel Best experimented with various forms of tractors for use in farming. They did so separately, with separate companies. On

15 April 1925 Holt Manufacturing Company of Stockton, California and the C. L. Best Gas Traction Company of San Leandro, California, were merged and formed Caterpillar Tractor Co. (Caterpillar 2010.)

Caterpillar products and components are manufactured in several facilities around the world. In 1954 Caterpillar started its activities in Brazil. Initially the company had a warehouse in the city of São Paulo where spare parts were both stocked and sold. In 1955, the company invested in the construction of its factory in an area the size of 164.000 m², and production started in 1960(Brasil.cat.com). Caterpillar has an extensive network of dealers in Brazil to provide sales and distribution of its forest machines, namely tree-length and to offer credit solutions to its clients. Consumer services are offered by its Brazilian dealer, Sotreq.

Logmax Ltda

Log Max AB, former Grangärde Maskin AB, is a Swedish company that has been designing and manufacturing machines for mechanized forestry operations since 1980. The company has major operations in the USA, Russia and Europe. In Brazil, Log Max uses a local dealer for sales and distribution of its tree-length and cut-to-length forest machines (Logmax.com). The company does not provide any information on financing mechanisms for its clients. Customer services are offered as part of contract service agreements and provided by distributors.

Valmet Komatsu Forest Ltda

Komatsu Forest is the manufacturer of Valmet forest machines. The company was founded in Sweden in 1961 and originally it was called Umeå Mekaniska. Valmet forestry machines are developed and manufactured at two different production sites: Umeå/Sweden and Shawano/USA.

In Umeå, Sweden, production is focused on wheel-based machines and harvester heads, while in Shawano, Wisconsin, production focuses on tracked machines and larger attachments such as felling and harvester heads.

Valmet started its sales operations in Brazil in 1983 using a local dealer called Implamater. In 1990 Valmet became Implamater's major stockholder and added its brand name to the latter. From 1991 on, Valmet started assembly of its forest machines in Brazil using a mix of locally produced and imported parts (Komatsuforest.com). Valmet Komatsu does not work with dealers; instead the company has a total of 11 offices located in the Southeast of the country that are used as sales and distribution points of forestry (cut-to-length and tree-length) and agricultural machines. The company provides financial solutions to its clients. Customer services are directly offered by the company.

6.3 Results and recommendations

Results and recommendations presented in this chapter are based on Ponsse Oyj's business strategies, distribution channels and customer service discussed in the previous chapters.

Develop sales strategies focused on members of forest outgrower schemes

There are two relevant aspects about the market for cut-to-length dual forestry machines: (1) Ponsse's competitors do not sell dual harvesters in Brazil, at least for the moment. (2) The demand for cut-to-length dual forestry machines is not being attended to by the competitors.

Ponsse Oyj manufactures Ponsse Dual, a hybrid harvester tailored to the particular requirements of small and medium-size producers of wood, whose properties are neither large enough to support traditional harvester nor is the amount of harvested wood sufficiently large to make use of bigger machines' full capacity.

After identifying a demand which can be satisfied profitably within the constraints and opportunities represented by the supplier's portfolio of resources, and which is consistent with the organization's declared objectives, all that is left to do is to actually implement ways to attend to the potential client's needs.

Therefore, based on the findings mentioned in the previous paragraphs, Ponsse Latin America Ltda should develop sales strategies of hybrid harvesters focused on small and medium-size commercial producers of wood, more specifically the members of forest outgrower schemes.

Develop strategies to support an increase in sales without compromising order management and the quality of offered customer service.

Referring to the logistics components of customer services mentioned in Chapter 5, it is reasonable to suggest that even established procedures to process orders in a manner as routinely as possible can be seriously compromised by an incorrectly dimensioned order intake system, having a direct result in the quality of offered customer services.

As explained by Rushton et al. (2006, 33) it is important to balance the level of provided service with the cost of that provision. Different clients have different needs, and it is tricky to find the right balance between the range of services offered, their real costs and whether these services are perceived as useful by the client or not. An appropriate customer service policy can be developed based on identifiable customer service requirements; in accordance with that, a suitable logistics operation must be established to provide such service.

Ponsse Latin America Ltda has a very lean structure in both manufacture and management levels. Sales staff consists of two persons, who are frequently out of office visiting clients. Clients contact the company by electronic means or by phone. Customer services are available on a 24/7 basis. Visits to prospective and actual clients are scheduled in advance. Overall the company's sales strategy is heavily focused on a number of major clients, which allows room for adjustments in the agenda for services and sales visits.

Forecasted growth of the Brazilian forest market, concomitantly with higher demand for forest machines and services (e.g. customization of old machines, intensive training for staff, extra spare parts requests etc), added to an increase in

sales of new machines may have a negative impact to the company's transaction elements described in Chapter 5.

Due to the very technical specifications to the machines and their information systems, plus the physical distance between the manufacturer in Finland and the assembly site in Brazil, order management poses a sensitive question for Ponsse Latin America Ltda: any substantial increase in sales can lead to bottlenecks in the order management system.

Ponsse Latin America Ltda should consider developing strategies to support an increase in sales without compromising order management and the quality of customer services offered. It is very important to make sure that the company's current lean structure can cope with rising demand for both products and services.

Analyze possible need for changes in current distribution channel

When choosing a distribution channel, not only one must pay attention to the market (environmental situation, market characteristics) and product characteristics, alongside with the company strengths and weaknesses, but also to the characteristics of the channel itself.

The structure of a distribution channel is often influenced by a large number of factors, which are not fixed, but can change over time according to the environmental situation, to the product and/or market characteristics, and finally the company's strengths and weaknesses. Ponsse Latin America Ltda favours a short distribution channel, in which the goods are moved from the manufacturer's factory to the buyer's warehouse. When the sales agreement with a client is signed, and the machines are ready for shipment by sea from Finland to Brazil, all that is left to do is to wait for the arrival of the goods. Once the machines arrive in Brazil, they are taken to the company's factory to be assembled and then delivered to the client's yard.

The participants in such channel are basically Ponsse Oyj, the parent company, and its Brazilian branch, Ponsse Latin America Ltda. Logistics service providers, commercial banks, insurance companies and customs brokers operate as channel facilitators.

Some of the reasons why the company opted for such a short channel length are shown in Appendix 1- Summary of factors influencing channel length:

Environmental characteristics: few competitors; booming economical conditions, with limited entry and exit of producers.

Product characteristics: high product value; heavy weight; large size; technically complex product; custom built; industrial good; large order size.

Market characteristics: small amount of customers; the product requires help for installation and servicing assistance.

Producer characteristics: relatively large firm, with full control of its marketing programme and strong managerial capabilities.

Back in 2006, Ponsse Latin America Ltda sought to establish an intensive distribution channel, which would give widespread market coverage in a dispersed customer base. However, the company could not reach an agreement with its prospective dealers, and was forced adopt a different strategy, emphasizing a direct contact with its clients.

As stated in the Ponsse Annual Report 2009, the company has a real interest in the customer, knowing the customers in person, and recognizing their needs. (Ponsse Annual Report 2009, 3.) But, is it feasible to make such a claim when aiming to supply such a potentially large market like the Brazilian one?

By using a network of distributors, Ponsse's competitors make it clear that they do not have such concerns about knowing their clients personally. In order to reach out to a larger range of prospective customers, at some given moment, manufacturers let go the concept of knowing their clients in person and divert their efforts to strengthening their customer relationship via the chosen network.

As previously mentioned in Chapter 2, the adoption of differentiated marketing strategy calls for an ability to segment the market and cater to diverse needs of each segment. In such a case, some segments are likely to be more important and justify a direct approach, while intermediaries may be used to reach more dispersed markets or the ones that have different needs, which would be best served by another channel member.

An analysis of the company's current distribution channels should provide answers to the following questions: Does the channel serve or supply the customer in the required way? How efficient is the channel? What are the channel's competitive characteristics? What is the level of services offered by the competitors? Can such a distribution channel cope with rising demand for both products and services? Once the answers are ready, Ponsse Latin America Ltda should decide the next steps: either change the structure of its current distribution channel or keep it the way it is.

7 SUMMARY

The objectives of this thesis are to analyze Ponsse Latin America Ltda's distribution channels and customer services in the Brazilian forestry market, and to identify a new potential customer group. This thesis uses qualitative research methodology; data collection is comprised of primary and secondary sources.

In general, this thesis provides an overall view of the Brazilian forestry market as a client for Ponsse Latin America Ltda's cut-to-length forestry machines. This thesis also identifies the members of forest outgrower schemes as potential clients for the company.

The theoretical part of this thesis starts with an introduction to marketing strategies and distribution channels. Next, the thesis presents customer service and logistics systems. The following chapters focus on the Brazilian forestry industry and timber harvesting methods.

The empirical part of this thesis is about Ponsse Oyj and its Brazilian subsidiary, Ponsse Latin America Ltda. Ponsse Oyj is a Finnish manufacturer of cut-to-length forestry machines and information systems, with global presence in approximately 40 countries. In 2006, the company established its Brazilian branch and initiated its activities in the country. The premises consist of a sales office and an assembly plant in the State of São Paulo.

Ponsse Latin America Ltda's most significant competitors are presented in the empirical part of this thesis, along with detailed information about offered technology, distribution channels and customer services. Forestry machines are very expensive assets and their sales do involve a considerable amount of negotiations about terms of payment, hence a client's economic and financial situation is the object of detailed examination.

Forestry machine business is not just about the sales of the machine itself, but also the services, updates and training that integrates a comprehensive package, which can be just as lucrative as the sale of the machine alone. In Brazil, Ponsse Latin America Ltda's preferred clients are major players in the forest-related business, the ones who have solid financial records and some are even evaluated by credit rating agencies.

This thesis introduces other relevant players in the Brazilian wood production business: the members of forest outgrower schemes. Important sources of financing, both private and governmental, are increasingly available to these producers of the agriforestry system, whose participation in the wood production chain dates to the 80's. In this thesis it is explained the reasons why, in the long term, non-industrial forest owners may play a more relevant role in the expansion of the Brazilian forestry market.

As for the Brazilian forestry market, this thesis presents data that indicates a growth tendency based on solid investments made by companies that are consumers of wood. Planted forests are the main source of all wood consumed in Brazil without significant volumes of imported wood. Nonetheless, the global financial crises that started in 2008 did affect the investments scheduled for 2008 - 2009, causing several delays in the expansion plans of existing pulp and paper industries, as well as in the construction plans of new plants. The culprit was a sharp drop in the demand for wood-based products by the foreign market. All these factors combined hindered the expansion of planted forests in Brazil for the first time since 2005, from an average annual growth of 5.4% in 2008 to 2.5% in 2009.

Finally, the thesis research questions are answered in the form of proposed suggestions. In summary, it is important to remind the reader that the findings and conclusions presented in this thesis result from primary and secondary data analyses, which suggest that the sustainable growth of the Brazilian forestry market offer a rather impressive opportunity for Ponsse Latin America Ltda to consolidate its position in Brazil.

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APPENDICES

Appendix 1- Summary of factors influencing channel length

Channel consideration	Favouring long channels	Favouring short channels
Market or customer characteristics		
Size of purchasing unit	Small	Large
Number of customers	Many	Few
Location of customers	Geographically dispersed	Geographically concentrated
Customer knowledge	Considerable and widely dispersed	Limited and concentrated
Installation and servicing assistance	None required	Help required
Producer characteristics		
Size of firm	Small	Large
Length of time in business	New to market	Old and established in the market
Financial resources	Limited	Abundant
Location to the market	Not centrally located	Centrally located
Control over marketing programme	Unimportant	Important
Overall resource position	Weak	Strong
Market coverage desired	Intensive	Exclusive
Managerial capabilities	Weak	Strong
Market information availability	Limited	Abundant and expensive
Power	Weak	Strong
Policy toward pushing product	Passive	Aggressive
Environmental characteristics		
Number of competitors	Many	Few
Number of resources controlled	Few	Many
Economic conditions	Recessionary	Booming
Entry and exit of producers	Easy	Limited
Economic customs and traditions	Stable	Dynamic
Location of competitors	Geographically dispersed	Geographically concentrated
Laws and regulations	Tight	Loose
Competition among customers	Weak	Strong
Market to be served	New	Old
Product characteristics		
Perishability	Low	High
Fashionability	Low	High
Size of product	Small	Large
Value of product	Low	High
Weight of product	Light	Heavy
Complexity of product	Technically simple	Technically complex
a Special knowledge for sale	None	Considerable
b Installation	Not necessary	Required
c Maintenance	Not required	Frequent or regular
d Service	Not required	Frequent or regular
Risk of obsolescence	Low	High
Age of product	Old	New
Product process	Standard	Custom built
Order size (quantities purchased)	Small	Large
Appearance of product	Undifferentiated (homogeneous)	Differentiated (heterogeneous)
Type of product (buying characteristics)	Convenience good	Speciality good
Type of product (market)	Consumer good	Industry good
Time of purchase	Seasonal	Non-seasonal
Timing of purchase	Frequently	Infrequently
Regularity of purchase	Regular	Irregular
Profit margin	Low	High
Width of product line	Narrow	Broad
Availability requirements	Delayed	Immediately
Number of products per line	Few	Many
Product lines	Unrelated	Related
Number of alternative uses	Many	Limited

Appendix 2 - Summary of key public funding lines for forestry activities

Program	BNDES Forest	FINEM	PROFLORA	PRONAF Forest	PRONAF ECO
General Objectives	<ul style="list-style-type: none"> Support activities for reforestation, conservation and restoration of degraded or converted forest areas, and sustainable forest management in natural areas. 	<ul style="list-style-type: none"> Support investment projects for implantation, expansion and modernization of companies. Bolster implantation, expansion and modernization project of companies. 	<ul style="list-style-type: none"> Support implantation and maintenance of forests for industrial use, burning in the drying process of agricultural products, biofuel production and agroforestry consortia; Bolster restoration and maintenance of preservation and legal reserve areas. 	<ul style="list-style-type: none"> Encourage forestry practice; Support forest management practices; Encourage agroforestry development; and, Provide technical support. 	<ul style="list-style-type: none"> Encourage renewable energy and environmental technology use; Support water resources storage; Sponsor small hydropower potentials; and, Encourage silviculture and conservationist practices and correction of soil acidity.
Operational Modalities	<ul style="list-style-type: none"> Directly with BNDES; Indirectly by accredited financial institution. 	<ul style="list-style-type: none"> Directly with BNDES; Indirectly by accredited financial institution. 	--	--	--
Fundable Items	<ul style="list-style-type: none"> Reforestation, forest outgrower scheme and sustainable forest management; Purchase of machinery and implements accredited by BNDES; Assistance and technical audit, certification, monitoring and training; Seeds seedlings and nurseries, acquisition, storage and production; Conducting and maintenance of forest crops. Others 	<ul style="list-style-type: none"> Civil works, assembling and installations; New and used machinery and equipment (only micro-enterprises), including industrial systems, accredited by BNDES; Import of new machineries and equipments without national similar; Expenses on studies and engineering projects related to investment; Working capital associated to fixed investment; and Others. 	<ul style="list-style-type: none"> Fixed and semi fixed investment and cost (35% of investment value); Forest seedling nurseries; Recovery of preservation areas and legal reserve areas (agricultural activities). 	<ul style="list-style-type: none"> Agroforestry systems; Projects of environmentally sustainable extractive exploration, and Silvicultural Proposals; Cost of implantation and maintenance of projects. 	--

Program	BNDES Forest	FINEM	PROFLORA	PRONAF Forest	PRONAF ECO
Beneficiaries	<ul style="list-style-type: none"> Legal entities under private law with administration headquarters in Brazil; Individual Entrepreneurs; and, Associations and foundations. 	<ul style="list-style-type: none"> Legal entities. 	<ul style="list-style-type: none"> Farmers (individuals or corporations) and their associations and cooperatives. 	<ul style="list-style-type: none"> Farmers belonging to Groups A, A/C, B, C and D of PRONAF 	<ul style="list-style-type: none"> Family agriculture farmers of PRONAF, which submit a proposal or technical project.
Threshold for funding	<ul style="list-style-type: none"> BRL 1 million 	<ul style="list-style-type: none"> BRL 10 million, depending on the operation area. 	<ul style="list-style-type: none"> Up to BRL 200 thousand per client. 	<ul style="list-style-type: none"> Group 'A': up to BRL 4 thousand; Group B: up to BRL 1 thousand and BRL 2 thousand; Group C: up to BRL 4 thousand and BRL 8 thousand; Group D: up to BRL 6 thousand; up to BRL 12 thousand; 	<ul style="list-style-type: none"> Up to 36 thousand; A family considered a unit production is allowed to have maximum of two consecutive loans.
Interest rate	<ul style="list-style-type: none"> Long-Term Interest Rate – LTR; BNDES bank fee of 0,9% per year; Credit risk up to 3,57% per year; Financial transaction tax 0,5% per year; Interest rate is set according to the type of operation 	<ul style="list-style-type: none"> Financial Cost¹⁾; BNDES bank fee up to 2,5% per year; Credit risk up to 3,57% per year; Financial transaction tax of 0,5% per year; Interest rate is set according to the type of operation. 	<ul style="list-style-type: none"> 6,75% per year. 	<ul style="list-style-type: none"> 3% per year. 	<ul style="list-style-type: none"> From 1 to 5% per year, according to the number of operations and the nominal value of fundings.
Term of payment	<ul style="list-style-type: none"> Up to 180 months, depending on the financed item. 	<ul style="list-style-type: none"> Established according to payment capacity of undertaking, company or economic group. 	<ul style="list-style-type: none"> Up to 12 years, according to the financed item. 	<ul style="list-style-type: none"> Up to 12 years; and Up to 16 years for resource from Constitutional Funds. 	<ul style="list-style-type: none"> From 2 to 12 years, according to the purpose of project submitted.
Financing agency	<ul style="list-style-type: none"> BNDES or accredited financial institution. 	<ul style="list-style-type: none"> BNDES or accredited financial institution. 	<ul style="list-style-type: none"> Bank of Brazil, and Other banks accredited by BNDES. 	<ul style="list-style-type: none"> Bank of Brazil; Bank of Amazonia (BASA); Bank of Northeast Brazil (BNB); and Other Banks of the National Rural Credit System. 	<ul style="list-style-type: none"> Bank of Brazil.

Appendix 3 - Summary of key public funding lines for forestry activities

Item	GREEN FNE	FNO FOREST	FCO PRONATUREZA
General Objectives/ Purposes	<ul style="list-style-type: none"> Encourage environmental protection, development of productive activities. 	<ul style="list-style-type: none"> Raise awareness of forestry sector producers about the need to develop activities that have less impact on the environment. 	<ul style="list-style-type: none"> Sponsor recovery and natural resources preservation projects.
Financing Items	<ul style="list-style-type: none"> Forest Management; Reforestation; Proposals for alternative energy generation; Energy conversion systems with environmental gains; Agroforestry and agrosilvopastoral consortia; Restoration of degraded areas; and Recovery of areas for legal reserves and permanent preservation. 	<ul style="list-style-type: none"> Sustainable forest management; Reforestation; Agroforestry; Industrialization; and Market promotions. 	<ul style="list-style-type: none"> Use of native or exotic species in the rehabilitation of degraded areas; Conservation and restoration of watersheds, headwaters; Systems utilizing alternative sources of energy; Agricultural wastewater Treatment; Environmentally sustainable food production; Production of organic matters for own use; and Transition cost from conventional agriculture to organic farming.
Beneficiaries	<ul style="list-style-type: none"> Farmers; Industries; Agroindustries; Commercial Companies; Service providers; and Cooperatives and associations. 	<ul style="list-style-type: none"> Farmers; Associations and cooperatives; and Associations, cooperatives and forest-based companies. 	<ul style="list-style-type: none"> Farmers; and Production Cooperatives and associations dedicated to production activities in rural areas.
Financing Terms	<ul style="list-style-type: none"> From 1.5% to 2% of equity of FNE. 	<ul style="list-style-type: none"> Mini producer: BRL 80 thousand Small producer: BRL 360 thousand Medium producer: BRL 1.6 million Large producer: BRL 4.2 million Associations and cooperatives of mini and small producers: BRL 2.4 million Associations and cooperatives of medium and large producers: BRL 4.3 million 	<ul style="list-style-type: none"> Up to BRL 4.8 million by economic group and by farmer cooperatives.
Interest Rate	<ul style="list-style-type: none"> 6, 8,75 and 10,75%, depending on the size of producer; 25% bonus on the financial charges in the semi-arid and 15% in other regions of Brazil to farmers in compliance with the terms. 	<ul style="list-style-type: none"> 6, 8,75 and 10,75%, depending on the size of the beneficiary; 15% bonus on the financial charges to farmers in compliance with the terms. 	<ul style="list-style-type: none"> 6, 8,75 and 10,75%, depending on the size of applicant; 15% bonus on the financial charges to farmers in compliance with the terms.
Payment Terms	<ul style="list-style-type: none"> Up to 12 years. 	<ul style="list-style-type: none"> Up to 20 years, according to the financed item. 	<ul style="list-style-type: none"> Up to 20 years, according to the investment.
Financing Agency	<ul style="list-style-type: none"> Bank of Northeast of Brazil (BNB) 	<ul style="list-style-type: none"> Bank of Amazonia (BASA) 	<ul style="list-style-type: none"> Bank of Brazil (BB)