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PRINCIPLES FOR PLANNING INVESTMENTS IN THE WOOD INDUSTRY

by

Z. Petric

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2/ Consulting engineer, INDUSTRIJSKI BIRO, Ljubljana.
1. INTRODUCTION

This study has been written for future investors in the wood processing industry and/or decision making personnel on investments in new factories or the reconstruction of existing ones. It could also be of use to all concerned with the preparation of projects.

Although UNIDO publications dealing with the initiation and implementation of industrial projects in developing countries and the preparation of feasibility studies exist, these problems have been treated in more or less general terms regardless of the specific characteristics of an economic branch.

This contribution is aimed at highlighting the problems of planning investments in the wood processing industry.

2. SOME NOTIONS ON PROGRAMMING AND PLANNING OF INDUSTRIAL PROJECTS

Project alternatives

The forestry and wood processing industry deals with wood species as a raw material, available in different species, forms and sizes and, thus, requiring different processing methods. Investors in the wood industry, dependant on domestic wood resources can select from among several processing alternatives. Wood is not such a homogeneous raw material as it seems to be at first sight. The processing of certain logs of definite size is very well determined. The scope of wood-working varies too. The decision on the processing of the available wood does not depend only on its type and size but also on its constant availability throughout the year. All these alternatives must be taken into consideration and analyzed prior to selecting the most appropriate process for the wood available.

Investment idea

Prior to investing, the investor must have a clear idea about the production level that is to be achieved as well as about the aim of the
production, the capacity of the prospective plant and its location. He has to know the limitations on the investments of the enterprise and the possibilities for financing available to it.

On the basis of the above-mentioned factors and of the critical selection of the production type, the investment idea is determined, based on needs and possibilities of investing into industrial plants in order to establish a new production. The investment idea is the result of the endeavour of one or more leading staff members or technical experts. It must be presented in writing in order to inform a wider circle of experts or authorities of the enterprise concerned.

Preliminary industrial survey

Each investment idea must be critically analyzed and evaluated. For this purpose, some more or less elaborate studies on different conditions of the future production should be prepared. The results of these studies may confirm or deny the existence of the basic conditions which are a prerequisite for establishing the future production facility and the justification of the investment.

Pre-feasibility study

On the basis of the investment idea and of the preliminary survey, the preparation of the pre-feasibility study can be started. This study has the format of a comprehensive study dealing with the various aspects of the proposed investment, i.e. evaluating raw material resources and supply, product range, production programme, market location, manpower, technological process, environmental protection, plant site, investment costs, production costs, investment economics and financing.

Feasibility study

The feasibility study is a techno-economic study on the proposed investment. Its contents are almost the same as those of the pre-feasibility study, however, the items are worked out in more detail. All the numeric
indicators are based on detailed calculations and computation. This concerns especially the investment costs which should not differ from the actual implementation costs by more than ten percent. The feasibility study is a basic document for decision making on investing, financing, co-financing, and purchase of equipment. This study is conducted by an authorized organization and prepared by a team of experts in different fields (e.g., consultants, designers, programmers).

Table 1 TYPICAL FORMAT OF THE TABLE OF CONTENTS OF A FEASIBILITY STUDY:

- PROJECT BACKGROUND AND HISTORY
- MARKET AND PLANT CAPACITY
- MATERIAL INPUTS
- LOCATION AND SITE
- PROJECT ENGINEERING
- PLANT ORGANIZATION AND OVERHEAD COSTS
- MANPOWER
- PROJECT IMPLEMENTATION
- FINANCIAL AND ECONOMIC EVALUATION
The depth to which the technological data should be studied is given in table II hereunder.

Table II CONTENTS OF THE TECHNOLOGICAL PLAN:

- RAW MATERIAL DATA
- CAPACITY DATA
- PRODUCTION PROGRAMME DATA
- YIELD DATA
- WOOD WASTE DATA
- DESCRIPTIONS OF THE TECHNOLOGICAL PROCESS
- DESCRIPTIONS OF THE MEASURES FOR WORK SAFETY
- DESCRIPTION OF THE ENVIRONMENTAL PROTECTION
- EQUIPMENT CAPACITY CALCULATION
- EQUIPMENT LIST (WITH TECHNICAL SPECIFICATIONS)
- MANNING TABLE
- ELECTRIC AND THERMAL BALANCE (REQUIREMENTS) ANNUAL CONSUMPTION
- ANNUAL CONSUMPTION OF UTILITIES
- ANNUAL CONSUMPTION OF COMPRESSED AIR
- LAYOUT
- FLOW SHEET OF THE TECHNOLOGICAL PROCESS
- SECTIONS OF ALTERNATIVES FOR THE TECHNOLOGICAL PROCESS
Implementation plans

The implementation plans include the entire project documentation for all production, ancillary, and other facilities, as well as utilities required for the full-scale operation of the plant. Only a legally authorized organization can be entrusted with the preparation of these plans which are then prepared by a team of specialized experts/designers.

Construction

The construction of the projected plant and of its facilities on the basis of the implementation plans is a long-term occupation that is carried out by a legally authorized engineering company. The construction encompasses the works from the preparation of the site, construction of buildings, infrastructure, erection of mechanical equipment and all the installations until the actual start-up and/or the trial-run of the plant.

Trial run

The trial run of the new plant is performed under special production conditions for a prescribed period of time. New workers get acquainted with their new jobs, and people concerned with the production organization gain new experiences. This is also the period of "de-bugging" machinery and equipment. As soon as the supplier has proved that the contractual outputs of the machinery and equipment have been attained, the investor takes over the plant's operation and management.

Full-scale operation

After the trial run has been completed and the production workers as well as the support staff are acquainted with the new plant, full-scale operation can start. The planned output of the machinery must be achieved, and the production quality must comply with the market requirements. During the full-scale operation, the production is expected to comply with the planned figures of raw material consumption, working time requirements and consumption of utilities. The full-scale operation should secure positive economic effects in order to repay the investments made.
3. **INVESTMENT PLANNING**

Investment planning encompasses all project activities from the investment idea up to the implementation plans including the supervision of the construction of the project.

Development planning embraces, apart from investment planning, development studies and forecasts on an economic branch or activity and/or enterprise. The latter, however, are not covered in this contribution.

The main feature of investment planning is teamwork by one or more experts, who gradually prepare plans for the construction of the industrial project at each phase of the investment.

Investment planning can be subdivided into the preparation of the pre-investment and technical documentation. The pre-investment documentation leads to the following phases of planning:

- pre-project investigations;
- pre-feasibility study;
- feasibility study.

The investment documentation covers a series of initial phases of planning comprising alternatives from which the final decision on the investment in the industrial project is selected.

The final phase of the investment planning covers the preparation of the technical documentation comprising the implementation plans for all buildings of the projected plant.

The implementation plans consist of plans for the:

- technological process;
- design of structures;
- project for utilities, i.e.
- for electric installations;
- for water installations;
- for heating installations;
- for lighting installations;
- for telephone installations;
- organizational project;
- project of installations for dust and waste removal.

As soon as the decision to make the investment has been taken, the plans of the work performed are kept up to date to follow the actual state of the construction. During the implementation of the project, it often occurs that the plans need to be modified or even changed. Therefore, the plans of the work performed are required in order to facilitate eventual modifications or additional work. This applies especially to all plans for installations. The engineering services include also the project supervision to be performed during the implementation by qualified engineers.

Phases of investment projecting

Let us assume that in a country where there is a virgin tropical forest in the public sector, the idea of wood exploitation may arise. In our case, the investment idea is imposed by necessity.

This is the case of a developing country without other surplus resources. Therefore, the only alternative to improve its balance of payment is to develop the production of wood and promote its export.

There is a state institution responsible for public forests. Experts of this institution prepare written information on the investment idea. On this basis, the authorities may take the decision to choose the partner who might be prepared to become a licensee for the forest exploitation, under very well determined conditions.

The state authorities are quite aware that by granting the wood exploitation licence, the initiative should not rest exclusively with the licensee. Since they wish to gain new experience and to control the enterprise, they agree with the licensee that the forest exploitation
is to be carried out in a form of joint-venture, joint-managing or profit-sharing.

Therefore, they have to collaborate at the very initial phases of investment planning and to cooperate in the preparation of all the necessary investigations.

A working team is formed within the framework of the state forest managing institution. The working team has to cooperate on behalf of the state (as proprietor) in all necessary investigations. It must be informed on the results of the investigations undertaken in order to participate on equal professional terms in the future decision-making.

The pre-feasibility surveys are carried out by many experts, each of them dealing in his own professional field. The pre-project investigations encompass the studies of the important factors having an impact on the future industrial project.

In our case, the following investigations are required:

- a forest inventory stating the available quantities and species of wood, and the annual allowable cut permitting a sustained exploitation of the resources.

- investigations of the potential transport alternatives with regard to the existant road network, vicinity of the despatching railway station and/or port, as well as investigations on needs and possibilities of the construction of the internal wood transport network.

The foregoing investigations facilitate the selection of the exploitation area and determination of species offering a feasible exploitation with respect to transport costs.

- a market analysis indicating the species and the quality that could be sold in great quantities, the price and the export possibilities.
investigations of the manpower available, analysis of its qualifications for the industrial production envisaged and the need for training. This type of investigation can be of use for the forecasting of the future impact of this industry on the working population and on the planned workers' migration to places where the possibility of employment may exist.

- investigation of the existant infrastructure showing clearly the need for investing in additional buildings that are a prerequisite for the forests' exploitation.

- investigation of the compliance of the programmed investment with the general public interest.

- other investigations that cannot be foreseen at this point may have to be carried out.

The results of the investigations performed enable conclusions to be drawn on the export possibilities of pre-determined quantities of logs of valuable wood species. The forest area, the annual allowable cut and the transport possibilities have been ascertained. Therefore, the study evaluation team proposes to start the next phase of pre-investment planning, i.e. the preparation of the pre-feasibility study.

On the basis of the previous studies, the concept of the planned investment has to be established in the pre-feasibility study. The quantity of the annual allowable cut, by species and quantity of logs and the kind of woodworking plants, and volume of log export are determined.

On the basis of the established production programme, the most appropriate technological process is selected, the type and dimensions of the required buildings and determined, and the costs of mechanical equipment, installations and other items are assessed. At that point, the economic effects of the production are estimated.

The results of the pre-feasibility study may clearly disclose that the less valuable wood species prevail, that are hardly marketable and/or
whose selling price do not even cover the exploitation and transport costs.

This would induce the conclusion that more valuable wood species from the forest areas near to transport facilities should be felled and exported. Less valuable wood species should be processed in a new woodworking plant inside the forests. In this way, it would be possible to produce and export semi-manufactured products that would be better marketable.

In the pre-feasibility study, the construction of the sawmill might first be foreseen, to be followed later on by the veneer plant.

It is assumed here that the estimate of the proposed production shows positive financial results.

The results of the pre-feasibility study would then encourage the leading experts to initiate the last phase of the pre-investment projecting - the preparation of the full feasibility study.

Feasibility study

The feasibility study is the most important part of the documentation prepared for the investment, based on the findings of the preceding studies. The technological process, the type and price of the equipment are finally and fully determined. The requirements of the buildings are determined based on the technological process selected and the construction costs are assessed. The main purpose of the feasibility study is to make available exact calculations of all necessary costs for the implementation of the industrial project. The main part of the feasibility study contains the computation of the future production costs and the profitability of the industrial project.

On the basis of the feasibility study:

- the investor takes the decision on investing in the planned industrial project;
- co-investors (partners) are interested in the project and the company is created legally;
- bank loans and guarantees are applied for;
machines and other equipment are purchased;
- technical documentation and/or plans for the implementation of the industrial project are finalized.

The feasibility study is the basic technological and techno-economic document on which capital decisions are based and must therefore be prepared extremely carefully. Eventual misunderstandings and liabilities such as the case of investment costs being exceeded, the machinery outputs not being achieved and/or the economic results being less favourable than expected, are compared with the situation foreseen in the feasibility study. This consists of several chapters dealing with:

- project background and history;
- markets and plant capacity;
- material inputs;
- location and site;
- project engineering;
- plant organization and overhead costs;
- manpower requirements and qualifications;
- financial and economic evaluation.

While the pre-feasibility study can be prepared by one or more experts, the preparation of the feasibility study proper requires team work with experts in the following fields:

- industrial economics
- market analysis
- technology
- mechanical or industrial engineering
- civil engineering
- industrial management and accounting.

The team for the preparation of the feasibility study can be assisted for short durations, if necessary, by specialists in other fields.

The feasibility study is aimed at confirming and justifying the planned investment, and showing the production costs and the economic results of the envisaged production.
Naturally, it may occur that the feasibility study shows that because of expected poor profitability the investment proposed cannot be recommended. In such a case, it is quite impossible to persuade the customer to finance or to invest in the industrial project proposed.

Let us reconsider the results of the feasibility study concerning the forest exploitation and the woodworking industry.

The report has confirmed that according to the pre-feasibility study positive economic effects may be expected in the forest exploitation, whereas the results of the planned woodworking industry would be only partly satisfying. Thereafter, positive economic effects may be expected in the exploitation of forest located near to the existent transport infrastructure, for the log transport costs are the most limiting factor affecting the yield of the forest exploitation.

Besides, the export of more valuable logs of "red" hardwoods would be profitable. The export of logs of other "white" hardwood species will be profitable only if the log production and transport costs do not exceed the export price.

The calculation of the profitability of the proposed woodworking industry proves that its construction should proceed carefully and gradually. For instance, the production of sawnwood of certain white hardwood species accepted on the market is profitable, whereas the sawnwood from some other white hardwood species, which are not yet accepted on the market could hardly be sold.

The feasibility study clearly defines also the investments required for individual production plants. The investment costs for the veneering plant together with the necessary boiler house are very high. It would most likely be impossible to get the required resources. Furthermore, the required annual quantity of wood that is to be peeled in the veneering plant is not high enough to justify so great an investment. In other words, the loans, if any, could not be paid back.
The feasibility study has proved that the investment should proceed gradually. Therefore, responsible staff members have decided to carry out the project of the forest exploitation and the woodworking industry in two phases:

First, they will organize the forest exploitation, and as soon as normal production giving positive economic results has been achieved, they will proceed to the construction of the small sawmill.

For this reason, the respective state institution has decided to entrust the same engineering company that had prepared the feasibility study with the preparation of the technical documentation. The technical documentation will comprise all the plans required for the construction of the buildings and the infrastructure.

**Project and engineering designs**

The implementation plans are worked out by a legally authorized engineering companies employing experts/designers in different branches, (technologists, civil engineers, electrical engineers, mechanical engineers, etc.). Each of them is qualified to carry out their respective designing independently.

The complete designs for the new factory are made by a leading planner/designer whose task is to coordinate the work of the experts of different branches into a homogeneous working team. He coordinates the preparation of the plans and is responsible for their quality.

The implementation plans include the plans for:

- technological process serving as the basis for further planning;
- studies for land draining, sewage disposal, roads and other problems connected with the site layout;
- plans for the production halls and other factory buildings;
- power plant; an appropriate transformer station if electric energy is available. If the energy has to be generated on site, plans for a boiler house or electric generator must be provided for;
- electric installations for lighting and power supply;
- water installations;
- compressed air distribution;
- other plans as and when required.

Mentioning other plans required, we should not forget the study of the production organization of the new factory. This is of great importance when introducing a new production facility in a developing country.

In addition to the technological project, having solved the problem of the flow of the production process, the equipment type and layout, the study on the future work organization needs to be prepared. It comprises the following items:

- work preparation;
- planning and distribution of production material;
- production planning and control;
- production quality control;
- gathering and processing of production data.

The work preparation comprises:

- determination of the work preparation within the framework of the plant's organization structure, setting up of the plant's organizational scheme;
- developing the basic and operation-linked information systems;
- preparation and issuing of the operation-linked documentation;
- description of the basic duties and working methods for each workplace.

The planning and production material distribution comprises:

- standardizing production materials;
- ordering and order scheduling for production materials;
- acceptance, storing and delivery of production materials.
The production planning and control includes:

- rough production planning;
- detailed production planning and scheduling;
- organization of the production;
- methodology for production control.

The production quality control comprises:

- creation of the service for the production quality control;
- introduction of the system for an in-process quality control;
- setting-up of the system for the final product control.

The gathering and processing of the production data encompasses:

- organization of the services for gathering production data;
- setting-up of the system for the storing of data and a suitable form of central data gathering;
- setting-up of the system for analysis and evaluation of the data collected.

4. THE PROJECT TEAM AND ROLE OF THE TECHNOLOGIST IN THE INVESTMENT PROCESS IN THE WOOD PROCESSING INDUSTRY.

This study is aimed at highlighting the impact, extent and importance of the technologist's cooperation in the long-term and complex activities of investment planning.

At the very beginning, and to facilitate its understanding the sequence of phases of the investment process, as they occur in practice are repeated hereunder:

- social planning;
- preparation of the investment documentation;
- working out of technical documentation (designing/planning);
- construction;
- trial run;
- full-scale operation.

It is a known fact that successful implementation of all phases of the investment process requires a harmonized cooperation of one or several teams of experts. Furthermore, the technologist must take part in all phases of the investment process.

**Role of the technologist in the social planning**

It is not by mere accident that the social planning is the first phase of the investment process. In practice, the harmonization of the investor's interest with that of the community, region and state, has often been neglected. Therefore, a certain period of time is provided so that the potential investor and the parties concerned can agree in order to assure the compliance of the planned investment with the general public's interest.

The result of the general social agreement should be the coordination of the investment plans (annual, short-term, long-term) of the potential investors with the plans of the community and the state. The aforementioned social agreement requires the pre-investment documentation. It is obvious that the social planning and the preparation of the investment documentation should be pursued at the same time.

Especially in the wood industry, the well-trained technologist has a decisive role in preparing the first documents on the future investment. At this stage, he should be assisted by an economist.

A good investment idea must involve: raw materials, market location, investment impact on the environment, branch development plan in the community and the country and the investing and/or financing capability of the investor.
Role of the technologist in the preparation of the pre-investment documentation:

The pre-investment phase of the investment process is the longest one. It comprises preparatory work in order to clear the basic problems and outline the preparation of the technical documentation. The investment decision is based on the pre-investment documentation.

A thoroughly prepared pre-investment documentation is a prerequisite for assessing the investment's profitability.

The preparation of the pre-investment documentation is subdivided into the preparatory work and the feasibility study proper.

(a) The preparatory work comprises very extensive work with a scope of defining the project in order to prepare the feasibility study. This preparatory work comprises:

- consultations for guiding the investor from the first investment idea to the correct implementation of the investment process;

- analysis and advice on all factors influencing investment profitability;

- the investment idea in a form of concise information on the scope of the intended preparation of the investment documentation.

This work should be of use to the management during the finalization of the documentation, the obtaining of the necessary approvals, the setting-up of the preliminary technological concept, and for social agreement and planning.

- investigation of all the problematic aspects which may confirm or not the investment proposal;

- the pre-feasibility study defining the technological process and other technical solutions, and comprising the economic appraisal of the proposed investment.
(b) The feasibility study is the final document of the investment documentation containing the data collected on the investment project and giving the proposals relating to the technology chosen, the buildings, installations for production halls, and infrastructure.

The feasibility study contains the lists and the equipment and building quotations, as well as the description of the general social benefits deriving from the respective investment, and the measures for protecting the environment.

The essential part of the feasibility study contains the economic evaluation of the project's feasibility and the structure proposed for its financing.

Although the investment documentation virtually represents the work of a team of experts from different economic branches, the crucial role is that of the technologist.

All the preparatory works for the technical documentation that have already been described (consultations, analyses, investment proposals, investigations, pre-feasibility studies) are intended to solve the technological problem and other activities which have to comply with the technological requirements. Therefore, the team preparing the investment documentation should preferably be led by the technologist.

The technologist entrusted with leading the working team - also called the project leader - should be an extremely well-trained expert knowing a great deal about the technological process and also about other branches involved.

The following branches, apart from wood technology are involved in the preparation of the technical documentation for the wood industry:

- forestry: enumeration of species and qualitative and quantitative appraisal of the raw material.
- wood trade: raw material purchase and sale of final products.
ecology: measures for protection of nature.
- mechanical engineering: mechanical constructions and evaluation of technical suitability of the equipment.
- installations: electric current, water supply, dust exhaust, etc.
- energy: use of wood waste;
- economics: assessing the viability of the entire technological concept and the individual solutions.

The team members entrusted with the preparation of the investment documentation can be formed into a successful team only by a leading planner knowing thoroughly the technological process and its implication in other fields. Otherwise, the work proceeds on an inadequate basis and the resulting feasibility study would be of doubtful value. It may be inferred from this that the technologist has a double task in the preparation of the investment documentation. Not only does he finalize the technological process, but he also coordinates the work of his team in the course of the preparatory work and the preparation of the feasibility study.

Role of the technologist in the preparation of the technical documentation.

The technical documentation comprises all plans permitting the construction of buildings, the public invitation to bid and the award of civil works, the purchase of the equipment, the implementation of the entire industrial project, and the surveying of the work performed.

Plans comprise: texts, drawings and descriptions.

According to its purpose, the technical documentation is subdivided into:

- the plan for the acquisition of the building's licence. This plan is based on the project as described in the feasibility study. The other technical documentation is based on this plan. Together with the necessary approvals, it serves to obtain the licence for the building.

- the plan for the public invitation to obtain offers from the performing companies and equipment suppliers;
the implementation plans, enlarged and worked out in detail in order to facilitate the coordination of the implementation works.

the plans of work performed, displaying the actual state of the industrial project and serving as a basis for settlement of accounts, maintenance and eventual modifications.

The technological implementation plan represents the crucial part of the technical documentation in the design of the woodworking plants. The usefulness of the buildings designed depends basically on the technological implementation plan that is to be designed by the technologist. At the stage of the project design, the technologist is the responsible person for directing the work of other specialized co-workers. At the stage of the preparation of the technical documentation, the function of the technologist is of utmost importance, for he is also responsible for the success of the entire technological project and for the complex coordination of other projects. The specialized co-workers are only responsible for their own partial inputs.

Role of the technologist in the construction period.

The performing companies, equipment suppliers, and supervision team undoubtedly bear the main responsibility in the course of the project's construction phase. But in practice, "design supervision" is required in order to discover and eliminate any mistakes in designing. There might be errors in the project documentation or, as very often occurs, errors creep in at the foundation piling. These are more or less small errors which can be easily corrected during the construction period without an impact on the technological process of the buildings.

Although all designers should participate in the "designers' supervision", pursuing and controlling the project's implementation, the complex project supervision can actually be carried out only by the technologist, for he must know the contents and the sequence of all plans.
The important role of the technologist during the stage of the project implementation is therefore obvious.

Role of the technologist in the trial run

The trial run represents the phase of the project implementation when most difficulties arise.

An uninitiated observer might feel that the factory would never achieve the projected outputs and product quality. Most commonly, there are discrepancies in functioning of the equipment supplied by different manufacturers. Furthermore, inexperienced labour working with new machines poses a problem. It is only by a concentrated effort of the technologist, the equipment suppliers, the investor's technical staff and the machine operators themselves that all deficiencies can be corrected in the shortest time possible, production results improved and finally, the projected outputs achieved.

Role of the technologist in full-scale operation

The role of the technologist/planner ceases when the trial run has been completed successfully. It is now up to the investor's technological group to control the production. They have to keep the plant's outputs and the production quality at the designed level. Full-scale operation continues to depend on the technological team whose task is to assure an even and constant production rhythm. The plant technologist takes over the duties of the former team leader (planner/technologist).

General notes on the role of the technologist in the investment process

The foregoing break-down of the investment process clearly shows the technologist's leading role in the whole investment process and the necessity of his participation in all phases of the investment process.
An uninstructed observer might find this statement a little bit exaggerated. But, it is based on the assumption that the technologist has to cope with the investment process for production plants with expensive technological equipment. This is virtually the case when the entire project engineering is based on the technological solution of the production process.

The previous statement does not apply, of course, to investments in projects where the technological equipment has only a subordinate function with respect to the building.

**How to engage the technologist in the investment process.**

At the preparation of the technical and the investment documentation, the investor is faced with the problem:

- who is to be appointed the technological planner/designer of the plant?
- where to find a well-trained and reliable technologist with adequate experience?

The solution of these problems depends, first of all, on the complexity of the industrial project. In cases of investments in less demanding production where the civil works and other design need not be subordinate to the technological equipment, the services of the technologist are less predominant.

But investment in demanding production requires complex solutions. The technologist then plays a much more decisive role. In such a case, it is better to engage a technologist/planner who is employed by a specialized designing company having wide experience in the preparation of investment and technical documentation, especially for the construction of bigger and more complex industrial projects.

In practice, many woodworking enterprises employ numerous research staff so that the technologist/planner may be selected from their midst.
This may be a good solution in the case of a specific production for which the designing companies are not able to provide services.

If the plant technologist is entrusted with the investment process, the following questions arise:

- Is the plant technologist well trained and able to cope with the problems encountered in the course of the preparation of the investment documentation when basic decisions must be made?

- Will the plant technologist, who still has to meet his duties in the factory, succeed in coordinating the work of the designing team, taking into account that the members of the designing team usually do not all work in the same place?

- Would not the engagement of the plant technologist in the investment process decrease his efficiency in running the plant?

- Would it not be more advisable to entrust this task to a more experienced expert of a specialized designing company?

The technologist employed with the specialized company often succeeds in performing the same task in a quicker, more economic and less expensive way.

For example, it often occurs in the wood industry that a plant technologist primarily relies on advice of the equipment suppliers and machine salesman for taking a decision. These trade experts could help in setting up the technological concept, but they would not study the specific conditions and circumstances of the country and/or the respective plant thoroughly.

By relying on the technological services of the equipment suppliers, the plant technologist often becomes forced to buy the equipment of these suppliers. The technologist/planner should therefore preferably be sought through a designing company.
Selection of the designing company

Generally, most of the designing companies focus their activities on buildings and installations, designing for all types of industrial projects and branches.

These companies usually take over the preparation of the building's as well as other plans, and as they do not employ the technologist, often underestimate the technologist's services.

If technological designing is required, they normally engage a free-lance technologist not on their permanent staff.

They hire either the customer's technologist or one employed by a competitor. In both cases, problems occur that have already been described in the foregoing chapters.

There are also specialized companies incorporating also technological departments. These companies cover practically all industrial branches and are capable of carrying out special investment projects.

It is recommended, to all potential customers intending to order technical and investment documentation needed for investment in the wood industry to contact a specialized designing company.

Prior to selecting the designing company, the structure, results, experience and references of the respective technological department should be analyzed.

5. CONCLUSIONS

This study deals with the principles of investment planning.

First, it contains the description of the basic notions relating to the programming and planning of industrial projects. Then, individual phases of the pre-investment and investment documentation needed for a forest exploitation project and the construction of primary woodworking industry plants described.
The difference between the pre-investment and the technical documentation is clearly shown. The preparation of the extensive pre-investment documentation requires a lot of preparatory work and consequently a longer period of time. The contents and/or the extent of the technical documentation is readily determined and it can be accomplished in a much shorter period of time than the pre-investment documentation.

The preparation of the pre-investment documentation represents the decisive phase of the investment procedure, for the decisions based on the results of the feasibility study can rarely be changed. The pre-investment research and studies have been stressed because they are of greatest importance in the wood industry owing to the limited quantities of raw material available.

It is very important that each developing country willing to cooperate with a foreign partner in forest exploitation and the construction of a wood processing industry, should have its own team of experts capable of cooperating in all phases of the pre-investment activities.

They should be able to pursue the results of individual studies, and thus to be informed about the advantages and disadvantages of the industrial project being considered.

In this way, they would be able to participate in preliminary and final decision making and in the implementation of the project. However, their influence is less marked in the course of the investment phase, since wrong decisions on investment have already been taken.

The implementation plans include the study of the production organization in the new factory. It deals with the following topics: work preparation, planning and distribution of production materials, production planning and control, and gathering and processing of the production data.

Special emphasis is laid on the fact that investment planning is a long-lasting and complex occupation. It can be performed only by a team of experienced designers. The important role that the designer/technologist
plays in all phases of the investment has especially been stressed. A member of the designing team is appointed as team leader whose task is to coordinate the work of the team. The team for designing woodworking plants should preferably be led by a well-trained and experienced technologist who at the same time designs the technological process.

This applies especially to investments in production where the work of other designers depends on the requirements of the technological process.

Designing companies having departments for wood industry and employing experienced technologists should be called upon for the preparation of the respective investment documentation.

7. BIBLIOGRAPHY

