

# **A STUDY ABOUT APPLICATION AND REFINEMENT OF A PRODUCTION STRATEGY FORMULATION MODEL IN A BUILDING COMPANY**

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## **ABSTRACT**

In recent years, there have been some important changes in the industrial context, which have turned the production function into an important competitive force in many enterprises. This is due to the fundamental role this function has had in the acquisition of competitive criteria such as cost and quality.

Based on this, the companies began to analyze the production function's decisions, no longer with an exclusively operational and short-term vision, but with a strategic approach linked to the company's global objectives.

Thus, this paper intends to study the application in a building company, of a production strategy formulation model developed by Barros Neto (1999). The objective of this application is to refine the model, as well as adjusting it to the local company's features in accordance with the work's progress.

The model's application lasted six months and included the following stages: strategic diagnosis of the production function, knowledge of the profiles of the company's customers and competitors, the company's objectives and the production function's objectives, development of plans and the follow up of the defined strategy implementation.

It was clearly observed that the success of this work depends strongly on the company's culture, strategic planning knowledge and the importance of production function for the firm.

## **KEY WORDS**

strategic planning, production function, competitive advantage

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## **INTRODUCTION**

The building industry is characterized by the incremental mode of manager's relation to decision making in the production function. Their profile is more entrepreneurial than managerial in the way they deal with the variables of the productive processes. There is a general lack of awareness among managers on the importance of formal strategic planning to company's competitiveness.

As a result of the low value given to strategic planning, building companies do not use strategy formulation models; sometimes they are not even aware of their existence.

Therefore, this work has an exploratory nature, as the subject of the elaboration of production strategies through models in the building industry is not dealt so much in the literature.

The model was applied in a building company in Fortaleza, over a period of six months. The company works selling low price apartments, as a contractor and constructor of the projects.

In addition, this work is relevant as there is little work on production strategy related to the building industry, especially the use of a model strategy formulation that helps to implemented some lean construction principles.

This article begins with a presentation of the theory of production strategy, followed by an explanation of the formulation model used. Subsequently, the company worked with is described in general terms as well as the research method. Finally, there is an analysis of the application of the model, the definition of actions that help to implemented some lean construction ideas and the changes to refine it and final conclusions on the work carried out.

## **PRODUCTION STRATEGY**

In this work, the definition of production strategy used is that given by Barros Neto (1999), which is a set of decisions regarding the production function, that should be coherent both with the company's competitive strategy (corporation strategy) and its other administrative functions (marketing, human resources, financial, etc.) considering also the internal competencies of the production function.

Based on this definition, the content of a production strategy is perceived as the result of two elements: competitive criteria and decision categories.

According to Pires (1995), competitive criteria are a consistent set of criteria that industry has to value to compete in the market. These are classically given as: cost, quality, delivery performance, flexibility and innovation.

According to its characteristics, objectives and the resources available (human, physical, financial etc.), each company prioritizes some competitive criteria, according to market tendencies and concentrates its efforts to get a competitive position relating to concurrence.

In this manner, the distinction between the production strategies adopted by different firms lies in the weight given to each competitive criteria and the way in which they are effectively sought in the day-to-day of the production area. (Santos and Pires, 1998).

There is also the question of trade-offs between the competitive criteria, that is, in improving a particular criterion such as cost, the company causes a negative impact on other criterion, flexibility for example.

With this, the need to prioritize competitive criteria is reinforced, as it has been observed that a company is not able to have the best performance in all the competitive criteria simultaneously, as some choices have negative impacts upon others.

A brief explanation of each criterion is given below:

- **Cost:** this is the oldest and best-known way of competing known to the production function sector. It consists of producing at the lowest possible cost, which can enable the practice of the lowest possible prices.
- **Quality:** this criterion is directly linked to product, meeting the explicit and implicit requirements required by the clients.
- **Delivery performance:** these are issues regarding the reliability and production speed.

According to Pires (1995), time delivery guarantee and production speed are powerful competitive weapons as there are more and more customized products and production using Just-in Time methodology, for example.

- **Flexibility:** customization and product variety, the reduction in the life cycle of the product, the rapid development of technology and the increased turbulence of the markets make flexibility the criterion with the biggest growth in value in recent years, Pires (1995).
- **Innovation:** this criterion is associated to the perspective of constant innovation in launching new products and using the most modern equipment. According to Slack and Brawn apud Barros Neto (1999), these competitive criteria are strongly linked to high technology companies and products with a short lifetime.

Below there is a definition of the actions that should be implemented for the competitive criteria selected to be achieved. This is done by grouping actions into decision categories characterized by a consistent set of individual decisions that act upon the companies' production function to cooperate with the achievement of the desired competitive criteria.

The decision categories considered in this work are: facility, production capacity, technology, vertical integration, production organization, workforce, quality management, relationship with suppliers, information systems, communication and planning and production control. The first four are considered structural categories and the last five are considered infrastructure categories.

In the literature there are various models for the production strategies formulation including the models of Slack (1992), Hill (1995), Fine and Hax (1985), Platts and Gregory (1992), Garvin (1988), Voss (1992), etc. Each of these six models, studied and described by Barros Neto (1999) work in the same way, seeking to relate market requirements to production performance.

Slack's model offers an importance-performance matrix that facilitates the understanding of competitive criteria and directs decisions associated with them. It is worth because helps in the decision prioritization phase.

It compares the importance given by clients to the competitive criteria with the performance of the concurrent company in these criteria in relation to the competition. Then, the crossing of these two questionnaires was done and the Importance-Performance was obtained. From the matrix, the production function is analyzed in relation to the worst competitive criteria within the matrix (located in the improvement zone or the urgent action zone).

## **THE FORMULATION MODEL**

The formulation model, on which this work is based, was the fruit of a literature review on production strategy, building industry, small companies and other models of strategy formulation linked to a set of interviews with specialists and a diagnostic strategy of production, as well as the results in construction companies of a model based on the dissertation elaborated by Barros Neto (1999). The formulation model is detailed in Figure 1.

The formulation process begins with a presentation meeting with the main objective of awakening the participants to the need for the formulation process. Then a strategic diagnosis is carried out of the production function in the company, where a thorough survey of the actual situation of the production function is carried out. Next, an analysis is done of the clients, competitors and competitive environment in which the company participates. Then the company and the production's objectives are defined and in the following stage there is the unfolding of these objectives to detect and analyze some objectives that have not yet been implemented. Subsequently, the actions plans are drawn up to guide the achievement of the objectives defined and finally there is the drawing up of the implementation timetable.

However, it must be highlighted that the process shown in Figure 1 and detailed in the above paragraph act as the script for the formulation of strategies, but the ways they are executed are flexible and adjusted to the peculiarities of each company.

Another point that needs highlighting is that there are not a set number of meetings either for the process or for each of its stages. This is because strategy formulation is based on discussions and the more the better. Thus, it is hard to stipulate the quantity and duration of the meetings, but it is necessary to take care in order not to lose the discussion focus.

Finally, the work of formulation should be carried out with the participation of the greatest number of people responsible for functions within the company, especially at the stage of detailing action plans, as these often require the support of other sectors of the company.

## **DESCRIPTION OF THE COMPANY**

The company where the formulation model was applied is based in Fortaleza and was founded in 1984. Since the beginning the company has been worked selling low price apartments and has built more than 180.000m<sup>2</sup> of constructions.

In its work the company acts as contractor and constructor and its organizational structure is based on committees. Currently, the company has 15 designs underway and six more to be launched in the next two years.

Most of the projects constructed are apartments of between 50m<sup>2</sup> and 70m<sup>2</sup>, aiming at the lower middle class and low-income market. The designs are charged in 74 mensal pagaments, with average values of between R\$300.00 and R\$700.00.

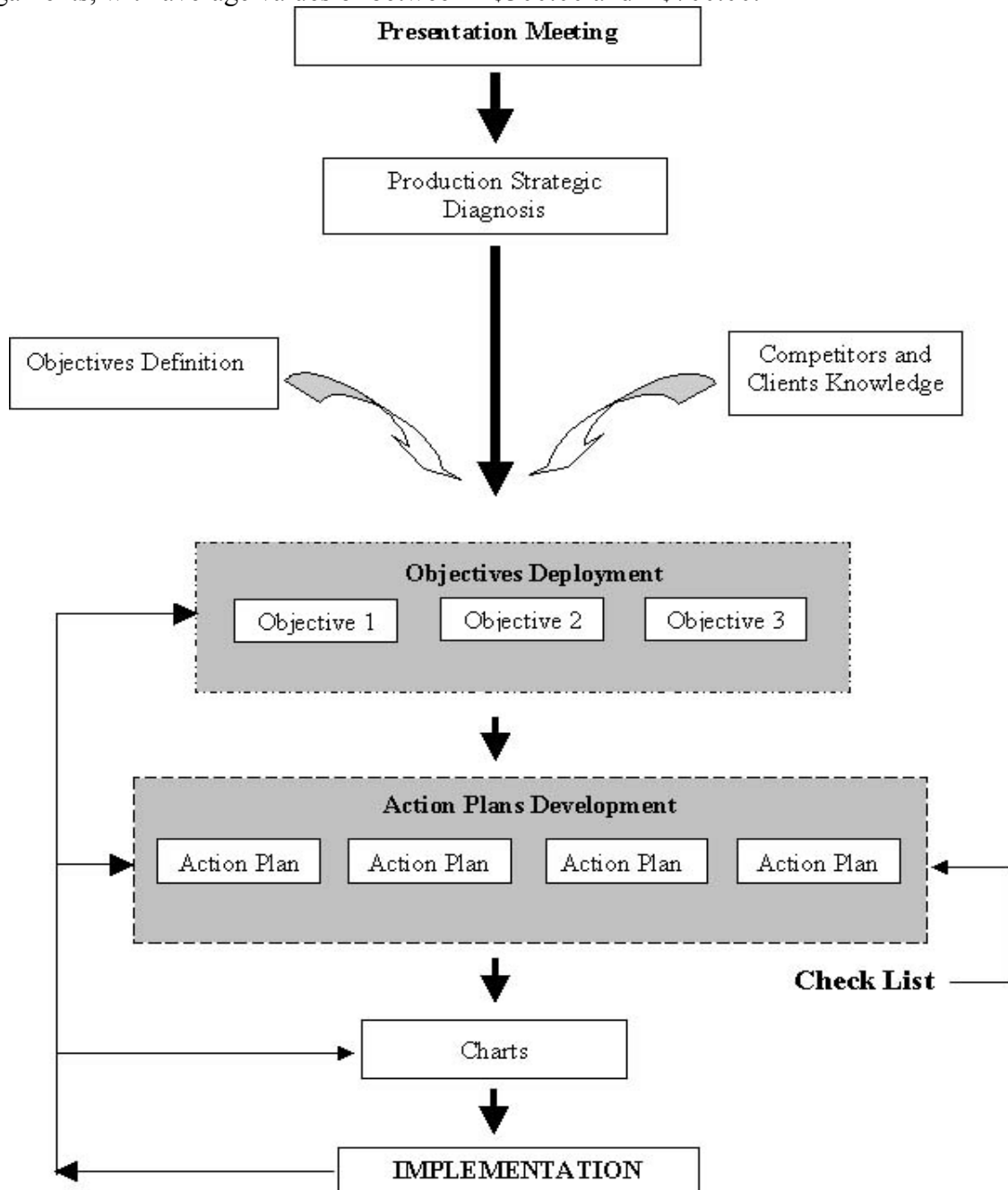


Figure 1: Strategy Formulation Process developed by Barros Neto (1999)

## **RESEARCH METHOD**

Firstly, it must be emphasized that this work was developed thanks to the initiative of the company, which sought out the university with the intention of developing strategic planning geared towards its production function.

It is also worth highlighting the elaboration of a manual that was given to the company staff. This contained a summary of the theoretical content on strategic planning and a description of the stages of the model, acting therefore as guidance both for the facilitator and the participants.

The work began according to the itinerary in Figure 1 and after the reading of the manual, with a meeting to present the model that took place with the superintendence and those responsible for all the sectors of the company.

The next step was the development of the strategic diagnosis of the production function that analyzed this function in comparison with the strategic context of the company. For this, there were visits to the company's construction sites, interviews with professionals linked to the production function, document analysis, filling out spreadsheets and an analysis of the perception of client's desires.

This stage of the work was done in an intensive and thorough manner, as it was the most time and effort intensive stage. However, the visits to the construction sites and the interviews were always subject to the time availability of the personnel of the company involved.

Site visits served to verify the operational and administrative practices, apart from checking the visual aspect of the construction sites, the equipment used and the working conditions, including work safety. Photographs were taken of the main equipment used, failures in work safety and the execution methods used by the company, including innovations.

The interviews were done by the researcher, following an itinerary adapted for each group of people, taking into consideration their degree of autonomy within the firm, their functions in the organization and their professional experiences. The questions were divided into the nine decision categories, presented in section 2 above.

There was a document analysis of the forms, contracts, supply register and. In addition, spreadsheets were filled in with specific data and information about the works, contractors and suppliers.

As the last part of the diagnosis, there was questioning regarding the coordinator's perception of the client's requirements and the company's performance against the competition to meet these requirements with the intention of obtaining an importance-performance matrix. For this a question form about the five competitive criteria asked their opinion of the importance the client's gave these criteria. Their view of their performance in relation to the competition was presented in a second form.

The result of the diagnosis was presented to the company staff (sectors involved directly or indirectly with the production function), at a meeting. At this point a discussion of the results was initiated but two further sessions were needed for the representatives of the company sectors involved, directly or indirectly, to have the opportunity to give their view

points regarding what was diagnosed and define what should be prioritized starting from the weak points diagnosed.

Next came the stages requiring only that meetings be carried out. For this, a fixed team was defined to participate in the meetings, which was based on a narrower involvement with the production function, that is, sectors whose activities were most related to the production function were favored. The team was composed of nine participants: the two superintendents/owners, the company's five engineers and the planning coordinators. The two-hourly meetings were held weekly. Minutes were kept of the meetings and at those where stages were concluded, the results were presented to everyone, in writing at the next meeting for the introduction of any necessary suggestions.

After the meeting of the results of the diagnosis, the first stage was to know both clients and competitors. The participants answered individually, and then in a group a question sheet that asked (for the stage of knowledge of the clients) who were the company's external clients (salary range, what they want and their characteristics) and what the production function ought to do to meet these requirements. For knowledge of competitors, the questions asked who were the company's direct and potential competitors, what they did well and what they did not.

Once this stage was over and after the compilation of the replies came the definition of the company's objectives and the production function that was also done through a question sheet. The questions related to what the company's objectives for the next five years would be and their implications for the productive function.

However, the final objectives to be explored in the next stage were not only defined from the previous stage (cited above). They were also fruits of the crossing of the weak points related in the diagnosis (and prioritized by the participants in the meetings to discuss the results) with the defeats, goals, objectives and weak points defined in the global strategic planning carried out by the company.

The result of this whole process was the production of a single document that gathered together five great objectives to be reached.

However, during the stage of exploring the objectives, these five objectives were summarized as three as two of them were completely covered by the other three. At this point the reasons for the non-implementation of the objectives in the company so far were enumerated and next the action plans to reach them was determined.

It is important to emphasize that, in this stage, the action listed for the three objectives became the work objectives themselves, which in turn were divided into the several sectors of the company that would be responsible to reach them. This would be done through designs, developed by the coordinators of these sectors.

This division happened on the initiative of the coordination for applying the model, as it was perceived that the objectives were too large to be reached only through action plans.

The last stage, the development of action plans was done in weekly meetings, where all the objectives that had been defined were contemplated. The designs elaborated by the coordinators, aided by the facilitator and discussed in the group until their final consensus were presented in their final version to all the company's sectors.

Finally, the designs were written in the company's standard model, containing among other aspects, the resources (materials, human, financial etc.) to be used, the methodology to be followed to reach the objective and the timetable for execution.

## **ANALYSIS OF THE APPLICATION**

The application of the model lasted six months, without any unforeseen events. It is worth highlighting that the company required that the process lasted as short a time as possible.

Some aspects of the production function that were related in the diagnosis are presented below:

- **Facilities:** the process of selecting the land to build the project does not pass through a complete economic and financial viability analysis and it has not moduled facilities to support the constructions; each new project needs new facilities.
- **Production capacity:** the company does not know its maximum production capacity and does not appear to have any prediction of the future demand for production, only a feedback from the sales sector. Besides the engineer/works relation was beyond the capacity of the team of engineers.
- **Production technology:** the process of technological innovation (development or purchase) is stagnated (the actual technology is traditional) and there are no discussions about improvements in constructive process or any questions about waste).
- **Vertical integration:** it was perceived that subcontractation is a trend in the company as a way of facilitating the project management. Then, it is necessary to discuss the development of partnership process among the company and suppliers.
- **Workforce:** there is a complete lack of training for the employees.
- **Quality management:** in work site, a lack of cleanliness and safety were observed.
- **Production Organization:** certain confusion was observed regarding the function of some professionals, the attributions of each one were unclear.
- **Production planning and control:** the time chart is not use adequately and some information are lost, making difficulties the company's planning and control.
- **Relationship with suppliers:** it is necessary to improve the planning of the relationship with suppliers, because there are constant problems with delays in material deliveries.
- **Information and communication system:** the company uses several types of software to manage its activities at its various functional levels; however, there is no interface between them, which causes difficulties in the transfer of information.



- In relation to the matrix obtained from filling in the spreadsheets, the following conclusions were obtained:
- The cost criteria fell exclusively in the appropriate zone, indicating that the company's decisions are coherent as this is a competitive criterion much valued by clients and in which the company has an excellent performance (better than the majority of its competitors).
- The competitive criteria of Flexibility, Innovation and time fell almost completely in the improvement zone, showing the need for better performance by the company in relation to its competitors given the importance client's attribute to these criteria.
- None of the competitive criteria of the company fell in the urgent action zone or in the excess zone, as they were concentrated in the improvement zone and the appropriate zone. This means that the company's performance is satisfactory, at least in the short term, in the competitive criteria valued by the clients.

After carrying out the diagnosis, there was the stage of client and competitor analysis, according to the model presented in the Figure 1. In general terms, the following conclusions were obtained:

- The company's clients come from the upper, middle and lower middle classes, with the latter concentrating the greater part of the clients, characterized by having a monthly family income of between 5 and 10 minimum salaries and prioritizing the competitive criterion of cost, in relation to the payment conditions. There was a consensus that rationalization process and knowledge in whole construction process is the main action to be taken by the production function in order to satisfy the client's requirements.
- In relation to the competitors, the conclusion was reached that the main competitor was the Housing Federal Bank, because it had the same target public. In addition it was verified that the payment conditions of this bank were its main strong point whilst the bureaucracy of the process is the main weakness.

After that, there were the stages of objective definition strength. However, as stated in the research methods, the objectives defined did not arise solely from this stage, as there came from the use of the data in the strategic diagnosis report and the annual company strategic planning.

The three objectives defined were:

- Invest in the areas of P.C.P. (Production, Planning and Control) and P.D.P. (Product Development Process) and Budgeting;
- Develop the technical and behavioral abilities of the professionals in the area of production;
- Develop the production with a view to: partnerships, supply chain and innovation;

After this phase (objective definition), some discussions about lean construction principles occurred in order to help the participants in the objective development. That is, the lean construction based actions to improve the company competitive performance.

As stated above, the attack lines to be used to reach these objectives become the desired objectives themselves and subsequently were divided into the various sectors of the company that began to work on them in the action plans.

The action plans suggested were:

- Production sector (engineers): revision and continuous improvement of the construction processes and incentives for technological innovation;
- Budget sector: revision and continuous improvement of the budget process;
- Supply sector: the institution of a program of partnerships.
- Human resources sector: the institution of a training and career plan for the workers

The contents of all the plans were discussed (until a final consensus was reached) in the presence of representants from all the company's sectors with a prevision of a year's duration on average, to conclude the plans.

## **REFINING THE MODEL**

Even though we had worked with the decision categories in the elaboration of the strategic diagnosis, these were relegated in the subsequent stages. This was due to the shift to work with company sectors to develop action plans that were structured using research plan phases.

Still referring to the diagnosis carried out, difficulties were encountered in the use of the matrix importance-performance with the general public (potential customers). The participants were unable to extract information from the matrix or visualize the company's performance through the positioning of the competitive criteria in the various zones.

It can also be said that the use of the annual company strategic planning in the stage of defining the objectives was very useful in applying the model. This was due to the time saved, as the strengths and weakness and the desired general objectives were already almost completely outlined, because this planning was carried out shortly before this time.

In addition, the process of working with structured designs instead of simple action plans was an unexpected innovation, but good in view of the complexity of the objectives defined and the company's own culture of working with this kind of design, discussing existing problems and using strategic planning to guide its activities.

Finally, the participation of the owner at the meetings was very important for the process, but at times it caused the concentration of decisions in his person and inhibited the other participants from giving their view points resulting in a strong influence on the direction of the work. In view of this, the facilitator had to manage everyone's participation, with the intention of reducing this influence.

## FINAL CONSIDERATIONS

It can be said that the application of the model was carried out successfully because all the activities planned were achieved in a forecast and useful timeframe for the company.

The aim of the refinement was reached, as has been shown there were modifications to some of the stages to adapt the model to the company's characteristics and to improve the process for future works.

However, these changes cannot be incorporated into the standard model immediately as time is required to study them, in addition to the need to wait for the future results that will occur in the company.

The use of lean construction principles helps the company to define the best actions to solve its problems, giving coherence in its decision making process.

Besides, the work with each company sector gives holistic vision to each participant. It happens because the company does not arrest decision categories (production strategy theory).

Finally, it is believed that the use of the model to formulate strategies for whichever sector of the company markedly facilitates the appearance of strategies that really contribute to the company's competitiveness.

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