

THE RELATIONSHIP BETWEEN STRATEGY AND LEAN CONSTRUCTION

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ABSTRACT

Lean construction is a philosophy that has been implemented in building firms around the world, in last years. But it is important to answer some questions: Will this implementation be the better alternative to these firms, in this moment? Will it be the best way to implement the principles of lean construction? Will the implementation of lean construction help firms to improve their competitiveness and success? What is the relationship between market and lean construction? Helping answering these questions is the aim of this paper, since it is necessary to introduce strategic aspects in the discussions about lean construction because firms are not isolated in the market. They have customers, labor force, competitors and other stakeholders that influence the performance of the organizations and consequently in the introduction of lean construction. This paper is a theoretical proposal that intend to show the importance of linkage between the implementation of lean construction and market aspects and, consequently, to stimulate and to facilitate the introduction of these principles in building firms.

KEY WORDS

Strategic planning; Lean construction; Small firms.

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INTRODUCTION

Many papers, researches and discussions have been carried out on lean construction, as can be observed by the large amount of publications and events related to the theme. However, in these not much is observed in terms of an approach to the strategic aspects of lean construction, neither there is a discussion of the importance of the study of strategic planning for the better introduction of this new philosophy of production in firms, for example. In view of the above, this paper intends to present a theoretical discussion on the link between the strategic approach and lean construction. It begins by presenting aspects related to strategic questions, continues with a brief discussion about lean construction and finally, presents some reflections on the link between strategy and lean construction, trying to introduce a strategic approach into the discussion on this new philosophy of production.

THE STRATEGIC APPROACH

Conceptual aspects related to strategy

The definition of strategies are directly linked to decision-making processes. However, according to Souza (1995), what makes a process *strategic* is the effect of present decisions (their link with the external environment and the competing position of the firm) and the term of these effects (long-term).

There are various definitions of strategy. However, one of the most complex and comprehensive is the one given by Andrews (1996). According to this, strategies are decision models in a firm that determine and reveal its objectives and desires, produce the main policies and plans to achieve these objectives and define the reach of the business pursued by the firm, the type of economic and human organization it intends to be and the nature of the economic and non-economic contributions that the firm offers its shareholders, employees, clients and the community in general. Equally, strategies have to be: clear, objective and attainable; concentrated adequately in the hands of decision makers; be flexible to adapt to movements in the market; have a coordinated leadership committed to the firm; be quick, secret and intelligent to attack unprepared opponents; and attentive to competitors moves.

However, with this definition and characterization of strategy it can be observed that a strategic decision has influence over a long period of time, commits a significant portion of the company's resources (human, financial, material) and affects the company in various ways (technological, organizational and capacity related changes), often leading to structural changes that are difficult to revert.

Mintzberg (1996) goes much beyond this in his definition of strategy. For this author, strategy can be divided into five great characteristics (plan, pattern, ploy, positioning and perspective) that are complementals and interrelated. However, the two most important are: **plan**, which determines the set of actions planned to deal with a particular situation; and **pattern**, which arises from a sequence (chain) of actions based on a consistent set of behavior within organizations over time.

In this manner, it can be observed that strategies are both **plans** for the future and **patterns** from the past. Within this view, it should be emphasized that the firm has a culture

based on the personal values of its members, which needs to position itself in an environment with various stake holders (clients, competitors and political, economic and social institutions) and which should always consider competitors movements when each new decision is taken².

Strategy is the fruit of a “negotiation process” between the firm’s objectives (plans) and organizational knowledge (pattern and perspective), which in turn are influenced by the information about the environment (internal and external). As a consequence of this negotiation, the ploys to be used and the positioning to be taken are also defined.

Within this approach to strategy as plan or pattern³, Mintzberg (1985) argues that two “pure” types of strategy exist: the deliberate and the emergent. Purely deliberate strategy exists when the strategy carried out is exactly the same as the intended strategy. For this to occur it is necessary to define precisely what the desires and intentions of the firm are and these should be shared with everyone within the organization. Finally, the organization should have control over the environment that should, therefore be totally predictable. A purely emergent strategy is characterized by a total absence of intention (neither from the upper manager nor any other member of the organization). Thus, in the deliberate strategy the characteristic of **plan** for future improvements is striking, whilst in the emergent type what prevails is the characteristic of **pattern** coherent with past events, influencing the emergence of strategy. In addition, the first type of strategy (deliberate) exclusively values the use of rationality, whereas the second takes into consideration the extreme use of intuition.

These pure forms of strategy are presented in Figure 1.

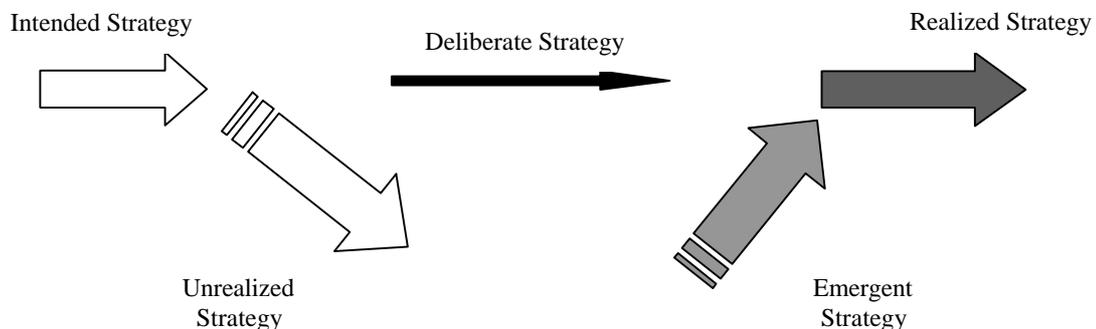


Figure 1 – “Pure” types of strategy

From Figure 1, it can be observed that realized strategy is a compound made of both types of strategies (deliberate and emergent). It is also possible to argue that, based on the above, it is almost impossible to obtain either of these pure types, as there is not complete knowledge of

² This last observation shows the relativity of strategy. That is, it does not need to be the best of all, it is enough to be better than your competitors.

³ It is worth highlighting that starting from these two approaches two schools of thought about strategy have emerged, headed by Ansoff (plan) and Mintzberg (pattern). The latter defends intuitiveness as a basis for developing strategy, whilst the former concentrates on the use of rationality as a means of reaching firm’s competitive strategies.

the environment around the firm, nor a total absence of intentions (it is hard to imagine actions with a total absence of intentions). Thus, the firms' strategies are found in a continuum between strategy as a **plan** (deliberate) or as a **pattern** (emergent), forming a combination of these two characteristics.

Castor and Suga (1989) defend strategic planning as being capable of guiding the firm in its competitive development. However, it should be consistent in the long term and flexible in the short term. They argue that it is important to understand that planning has a political dimension beyond the technical dimension, and despite being a long-term activity it should create short-term benefits as a condition for survival. They suggest some strategies to facilitate the introduction and acceptance of planning: use the planning unit as a "compensation chamber" for ideas from the whole organization to demystify the idea of an elite unit, sovereign and superior to the others; maintain direct relationships with other sectors of the firm; and, finally, introduce the practice of planning in a gradual manner so that it becomes a natural and spontaneous act.

In relation to small businesses, Brouthers et al. (1998), using their research with eighty organizations, are more emphatic. They defend the ostensive use of planning to the detriment of the use of intuition as, for them, the influence of manager's personal characteristics, forged in past experiences, hinders the search for, use and analysis of information in the environment, consequently difficulting the process of change to which organizations must submit themselves in order to survive in an increasingly competitive market.

Leaving aside the radicalisms and the antagonistic perceptions of both sides, there are important contributions from both schools to the process of strategy formulation. Corroborating this, one can paraphrase Ichikawa (1997, p.7): "used as an instrument, strategic planning can turn importance again in organizational processes, but it is necessary to be aware of the limitations of this instrument, because organizations do not function merely as arbitrary formalizations. The craftsman's touch is also important."

Mintzberg (1973) suggests an adaptive planned decision-making method, which begins with the definition of specific objectives and alternative strategies through structured formulation plans, but it is left flexible to the point of organizations being able to adjust to changes in the environment. The same author also emphasizes the use of plans as one of the characteristics that define a strategy.

McGinnis (1984) agrees with the above and believes that the development of any strategy includes both aspects of analysis (plan) and intuition (pattern) and that the integration of the two is the best way to get benefits from strategic planning. For this author, the use of structural analytical processes defines and amplifies the search for information in the environment, as well as helping in the discussion process that identifies the strategic alternatives to be considered. The use of intuition allows the exploration of insights, developed from the analytic process, creating opportunities for the development of innovative strategies emerging from the discussion process carried out during the analytic phase. Wilson (1998) agrees and emphasizes that the planning process should be sufficiently organized to structure thought yet sufficiently flexible to allow the complete expression of the participant's intuition and imagination.

Strategic questions and building construction

Initially, it is interesting to make some considerations concerning the characteristics of small housing construction companies. There is a high demand for habitation in the country, allowing many firms of different sizes to work. In addition, there are low entry and exit barriers for small housing construction companies, the technology is socially widespread and demands few investments in the purchase of equipments and machinery or in training the workforce. This is a highly fragmented market and many firms seek merely to survive and supply their owners with a good lifestyle without a greater concern with growth.

On the other hand, there is a constant instability in the sector due to its strong dependence on macroeconomic factors in the country. Consequently, firms do not have a constant volume of resources to finance habitation nor it is possible to maintain the buyer's purchasing power, which affects the quantity of launches and the carrying out of buildings. There is also the lack of a competitive culture between firms because this industry is fragmented (many firms in the market) with high demand for habitation (in Brazil, there is a high habitational deficit). In these characteristics, firms have myopic strategic vision with operational approach and they are not too forced to fight other competitors because there is market for all of them.

These considerations and thoughts, allied to an emphasis on a short time vision, the valuing of the short-term and organizational flexibility lead to the observation that there is a lack of a culture of strategic planning in the sector and it is seldom used by small firms, with a consequent valuing of adaptability as a strategic posture. Barros and Prates (1996) go further and emphasize that due to the little value given to memory, small firms, influenced by their flexibilities, seek to recreate everything without considering strategic planning as a continuous and consequential process. The formulation of strategies is the responsibility of the firm's Chief Executive Office (CEO), with the process being highly intuitive, non-analytical, informal (it is rarely explicit) and taking many uncertainties into consideration. Consequently, these firms work in an incremental fashion reacting to changes in the environment (Rossetto 1998), with the chosen strategies being heavily influenced by the formulator's desires, beliefs and view of the world (Mintzberg 1995).

However is worth emphasizing that firms often have ill-defined objectives that reflect the aspirations of the CEO but which are rarely explicated to the other members of the firm, running the risk of being inconsistent, incoherent or not as comprehensive as they should be. This can cause, for example, wrong investments, the entry into market niches that are of little interest to the firm and the loss of business opportunities for the organization etc.

The hierarchy of strategic planning

There are three types of planning: strategic, which is concerned with long-term issues, influencing the whole firm and impacting strongly on the firm's future; tactical, which uses the information from strategic planning, defining medium-term actions for the firm's sectors; and operational, which deals with practical, short-term issues arising from the above planning types and of a restricted impact.

In addition, there are three strategic levels: corporative, business and functional those are presented in Figure 2 (Wheelwright 1984). It can be seen that for the firm to obtain a good competitive performance the decisions at the three levels must be coherent with each other.

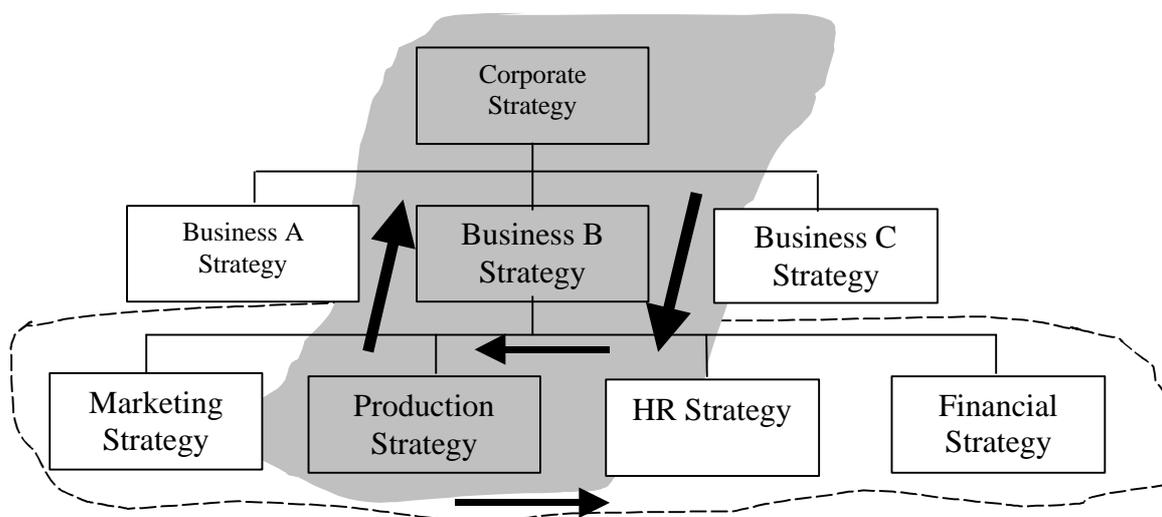


Figure 2 – Levels of strategy (adapted from Wheelwright 1984)

Corporate strategy refers to the corporation (group), which seeks to manage corporate resources (applied in various market niches, for example), to organize the corporation strategic objectives and to define in what business the firm will participated. The second level (business strategy) defines the limits of each business, seeks new business opportunities, analyses environmental changes and clarifies how the firm should maintain a competitive advantage in each one. Finally, functional strategy defines how a particular function will support the desired competitive advantage sought by the business strategy and how it will relate itself to the other functional strategies⁴ (Wheelwright 1984).

It is important to mention that even in a small company there are strategies relating to the firm as a whole and strategies relating to the market niches in which the firm acts. In the case of building construction a firm can be active in two markets, for example: residential and industrial construction, which demand very differentiated strategies, both business and functional. If the firm is only active in one market niche, corporate and business policies are same.

To facilitate understanding of the linkages between the strategic levels, the example can be used in which a business strategy (or competitive strategy) of a firm is to act in markets that prioritize time as competitive criteria (commercial centers, hotels, hospitals etc.). To be coherent its productive function will have to be organized in such a way (adequate technology, training of workers, use of planning tools etc.) that it is capable of helping the firm achieve competitive success, concluding works as quickly as possible and within agreed deadlines.

An important point for the effectiveness of corporate strategy is the internal and external coherence of decision-making process. The first occurs in two ways: between functional strategies (and competitive strategies) themselves (*horizontal coherence*) and between the

⁴ Figure 3.2 shows that other functional strategies exist: marketing, human and financial resources that should also be coherent both with the firm's strategic strategy and with each other. However, it is beyond the scope of this work to deepen the knowledge of these other strategic functions.

strategies of the three hierarchical levels (*vertical coherence*). In Figure 2, the shaded area represents vertical coherence whilst the stippled zone represents horizontal coherence. The arrows show that the strategies, at any level, influence and are influenced by the others. For example, business strategy influences production strategy and vice-versa; and production strategy influences financial strategy and vice-versa.

Figure 2 demonstrates that various functional strategies exist: production, marketing, human resources and financial, that should also be coherent both with the firm's competitive strategy and with each other. However, due to its link with lean construction, this paper will deal in more detail with production strategy, which can be defined as the pattern of decisions relating to the function of production and that should be as coherent with the firm's competitive strategy as with the other administrative functions (marketing, human resources, the financial sector etc.), also considering the internal competencies of the function of production. In addition, it should have these characteristics: consider a long-term horizon; have a strong impact on the organization; focus on fundamental activities, allocating resources to a few objectives; cover a wide range of activities throughout the whole organizational structure.

Production strategy

After defining corporate and competitive strategies, the production strategy is defined by determining the competitive criteria that should be prioritized, in function of its internal competencies, type of market in which it acts, degree of competition in this market and type of product it produces. After definition of competitive criteria, it is necessary to define a set coherent that support these criteria, that are grouped into two categories. Firstly, structural decisions, these are onerous, long-term and difficult to reverse; and secondly, infrastructural decisions that are less onerous, shorter-term and more easily demobilized (Wheelwright 1984). Figure 3 summarizes the above material.

With this strategic approach to production, it is sought to insert a vision of competitiveness into the production sector or the incorporation of the concept of efficacy together with the concept of efficiency. With this, it is introduced a greater preoccupation with knowledge about clients, competitors and market within the decision-making process related to the production function. Consequently, the search for maximum efficiency (cost reduction) will not always be the main competitive objective of production, as they may be another objective that fits in better with the firm's competitive strategy. For example, in a commercial building (a shopping center), the deadline may be more important than the final price of the undertaking, as the more rapid return of sales may compensate for the extra charge for delivering the building in a shorted space of time.

Furthermore, it is necessary to warn of the danger of the panaceas that exist, for example, around new technologies or management and training programs. It is common for firms to acquire or implement these without asking whether they are really important to support or give leverage to their competitive strategies. In relation to this, it is notorious, for example, to note that many building firms acquire some technologies (especially at trade fairs and events) that later on are underused or not used at all, because at the moment of purchase it was not verified whether there would be a sufficient volume of work for their absorption, whether the workforce was trained, whether there were raw materials available in the market for the new

type of technology and whether it really was the most important to obtain a competitive product etc.

PRODUCTION STRATEGY

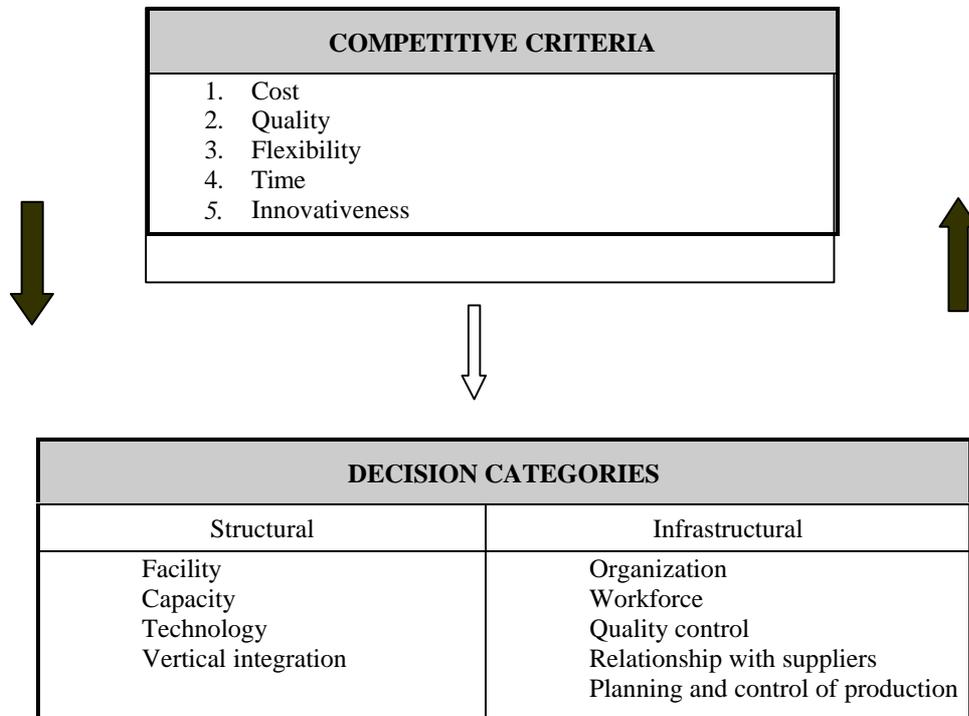


Figure 3 – The content of production strategy

The previous paragraphs have sought to discuss strategic issues related to decision-making in building firms to subsidize the discussion of this topic in relation to lean construction, which is detailed below.

LEAN CONSTRUCTION

The discussion of this subject will be brief, as it has been dealt with by various authors and it would not be interesting to go into more detail as this would be tedious for readers. Thus, this text will stick only to the principles of lean construction and some methodologies for their implementation, based on Koskela (1992).

The principles of this production philosophy are: reduce the share of non value-adding activities (also called waste); increase output value through systematic consideration of customer requirements; reduce variability; reduce cycle times; simplify by minimizing the number of steps, parts and linkages; increase process transparency; focus control on the complete process; build continuous improvement into the process; balance flow improvement with conversion improvement and benchmark.

According to Isatto et al. (2000), the principles interact strongly with each other and they should be applied in an integrated way in the management of processes. However, the existence of a lot of research on lean construction based on only one or a few principles is notorious. Often, this occurs because the principles are very wide and it is hard to work with them in an integrated manner. Nonetheless, this procedure can compromise the understanding of the whole and of where one wants to go, running the risk of investing a lot of time in the implementation and in the end not achieving the desired effect. So, the strategic approach can contribute to better planning through the definition of long-term objectives that are coherent with the firm's needs. In addition, the sequence of implementation can vary from firm to firm due to their internal characteristics and their conjunctural needs. Once again, the firm's strategic definitions can help providing more coherence in the process.

Some methodologies and tools have been presented with the objective of helping the implementation of the principles of lean constructions: just in time (JIT); total quality management (TQM); time based competition (TBC); concurrent engineering; reengineering; visual management and total productive maintenance (TPM), among others.

Once again, there is the issue of partiality in the approach, because some of these methodologies are directly linked to some principles, such as TBC with the reduction of the time cycle. In addition, many of these methodologies (JIT, TQM) are used in other types of industry and the literature already discusses and demands their strategic approach to avoid the wastage of seeking to use them without checking the real need for them, as well as clearly defining the objectives and steps to be followed by the firm.

THE DISCUSSION ABOUT STRATEGIC APPROACH AND LEAN CONSTRUCTION

After explanations above, it is important to start a discussion on the application of the concepts related to the strategy and lean construction, because, it has been seen, decision-making by the CEO of firms is linked, implicitly or explicitly, to the strategies that the firms follow. So it is necessary to make some question to open the discussion:

1) How is strategic approach adopted by building firms? What are the consequences of introduction of lean construction? Accordingly to characteristics of building firms, the more common used strategic approach is the emergent strategy based on **pattern**. This occurs because it is not common to firms to develop a structured and formal strategic plan and the decision-making process is based on the experience of firm's managers. This can cause problems because decisions probably will show a myopic, not including and not systemic approach, influencing long-term performance of firms. As a consequence, the introduction of lean construction is committed because there is not a plan or coherent thinking line to drive firms in a safe path to the application of the whole lean construction principles, avoiding an up-and-down introduction with a great waste of time, causing probably a low motivation of people along the process.

2) Do all building firms really need to apply the principles of lean construction? This question is important because firms must avoid the risk of to apply principles indiscriminately if these are not linked to their strategic needs, because depending on the market in which the firms are inserted their competitive strategies will vary according to the stimulus they receive from competitors, clients and the environment itself. JIT, for example,

should not be implemented in every type of production, but only in those markets that require low flexibility.

3) Is it possible to introduce the principles of lean construction without discussing a firm's strategic objectives? This point is important because the lack of long-term strategic objectives or a vision about the future can create a myopic perspective for the organization leading to a short-term, operational vision (one of the main problems in building companies). A lack of concern with strategic objectives, together with a lack of definitions of strategies to be followed can create a strict application of the principles of lean construction in firms, and consequently a lack of strategic alignment. An example of this can be given when companies invest in improvements (introduction of dry wall, for example), but forget to think about market demand, culture of the people of the region, impact in the supply services and some sectors of the firms.

In addition, the lack of statement of clear and well-defined strategic objectives can undermine the implementation process of lean construction principles, because the objectives give a direction to be aimed, facilitating the definition of stages in this implementation process. In the literature, there is not much discussion about the strategic aspects related to lean construction. There have been only isolated discussions about the introduction of some principles at some stages of the project (design, production etc.). The previous discussion about strategic aspects relative to decision-making would enable a more coherent and logical implementation.

This unclear definition of where the firm wants to get in a particular period of time also compromises the rhythm of introduction of the principles of lean construction, therefore if people in the organization do not have an idea of the time they will have to introduce changes and the fulfillment of goals is compromised.

4) Should the form and the sequence of the introduction of the principles of lean construction be the same for every type of company? As has already been mentioned above, firms act in different types of market, which present different environments (competitors, clients, suppliers, conjuncture etc.). This differentiates considerably the competitive criteria that the firm should value to gain market share. For example, some markets value flexibility over price or speed over quality. In view of this, it should be questioned which are the steps to introduce the principles of the new philosophy for each criteria and whether all the principles should really be introduced.

5) What is the reflection of the introduction of principles of lean construction on the rest of the firm? This question is necessary because the production function is directly linked to other functions in the firm: finance, marketing and sales, etc. So changes in the production will impact on all of the others and these change needs to be thought out in advance, to avoid strategic incoherencies that affect, in the future, the firm performance by the firm and so that the new philosophy can truly change the organization's way of production with less waste time.

6) What is the linkage among strategic, tactical and operational levels? In the introduction of lean construction, the strategic, tactical and operational levels are present. Therefore, it is important to assure that information and communication are diffused coherently by the firm. The discussion about strategic aspects introduce issues, such as client's needs and added value of products. This information needs to cross all the firm to help their members in the

development of their functions in a coherent and logic way, in agreement with production strategy approach (item 1.4), in case of production function.

If it is showed the coherence in this path, since the market up to the operational phase, with contribution of the lean construction to the competitive success (waste reduction, cost reduction, profit rise etc.) of the firm, it is easier to convince owners and managers about the importance of this philosophy.

CONCLUSION

In the paragraphs above, the intention was to open a discussion on the need to introduce a strategic approach into lean construction, because this new philosophy has structural implications for the firm and a wide impact, not only on production, but also on other sectors of the firm. Besides, the introduction of changes demands, for example, the allocation of resources and a change in posture by managers; and strategic planning certainly helps with this, as the priorities of the firm become known, as well as future benefits. The difficulty of introducing lean construction in firms is probably related to a lack of a coherent and aligned vision of the future benefits that the firm will have. That is, of defined strategic planning.

It is also perceived that the introduction of improvements in the function of production based on lean construction are self-contained and do not have a holistic character for the whole firm, without planning or previewing the benefit this will bring to the whole organization.

In view of this, it is necessary that the strategic aspects (competitive environment – vision of the future, resources, etc.) of the firm be considered at the moment of the decision to introduce the principles of the new philosophy of production. The intention is to guide the choice of the sequence of implementation, to convince managers, in the allocation and prevision of resources, in the correction of the firm's weak points, in the definition of targets and objectives to be met in set periods of time, of checking impacts on other sectors of the firm, among other consequences.

Finally, it is suggested that greater discussions about the strategic approach linked to lean construction be developed. To help this, some questions, such as: How to link and develop strategic planning associated to lean construction with the intention of helping the firm in the implementation of this new philosophy of production?, need to answer in the future.

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