

# **ENTREPRENEURIAL STRATEGIES AND NEW FORMS OF RATIONALISATION OF PRODUCTION IN THE BUILDING CONSTRUCTION SECTOR OF BRAZIL AND FRANCE**

**Francisco F. Cardoso<sup>1</sup>**

## **ABSTRACT**

This article presents an inquiry-research conducted in France (Cardoso 1996) which was aimed at identifying and analysing new forms of rationalisation of production employed in the building sector, both in France and Brazil, in the light of strategies of the building construction firms.

The above mentioned research dealt with the issue of the productive competence of the building construction firm, not only by means of higher efficiency but also of the perception of meso and macroeconomics contexts of where the production system is situated; this is done based on the competitors viewpoint.

## **KEY WORDS**

Strategic planning, competitive advantage, production strategy, building construction, construction enterprises.

---

1 Assistant Professor, Civil Construction Engineering Department, Escola Politécnica of the University of Sao Paulo, CP 61548, 05424-970, Sao Paulo, SP, Brazil, +55 (11) 818 5469, fax: +55 (11) 818 5715, fcardoso@pcc.usp.br.

## INTRODUCTION

Several changes in the Brazilian meso and macroeconomics contexts in the early 90s resulted in an unprecedented rise in competition among building firms. The sector became very competitive as evident in the degree of commercial and financial efficiency. There was added to the productive inefficiency issue of the general contractors, the absence of competitive efficiency. The threat facing Brazilian building construction firms was that they would no longer be able to conduct their basic activity, which was: to build.

Meanwhile, the resulting substantiations were hardly surprising; since analysis of the building sectors of France and Europe, as well as in other industrial sectors pointed to the fact that, they too, were experiencing similar transformations, with similar consequences.

This was a paradoxical substantiation: of a weak competitive situation and an outstanding logic of commercial and financial efficiency, in the face of which, companies could afford to neglect techno-economical efficiency, the building sector in Brazil was experiencing the reverse situation. As they faced an ever rising competitive market, companies could only be effective provided they could, at the same time, be technically and economically efficient.

The central consideration was no longer for efficiency, better production, or optimisation, which could be re-expressed as a criteria of quality and productivity. The question could no longer be dealt with from the operational and managerial point of view. The strategic level was now indicating a function of primordial importance. A building construction firm could no longer accept to be merely efficient neither could it only manage the activities carried out through its production system; it would have to be both more competitive and more efficient.

On the other hand, the firms perceived that they could no longer mention growth in terms of competence without taking into consideration the external circumstances and the positioning, in terms of competitiveness, within the several markets where they intervened. The analysis of business strategies appeared to be fundamental.

This article examines the competence conditions formulated in this context according to the terms of the “New Forms of Rationalisation of Production” (NFRP). For that, it propose a typology of NFRP that could represents the strategies conducted by building firms (eight Brazilian firms are analysed).

## RATIONALISATION OF PRODUCTION AND CHAIN OF VALUES

Although our starting point was a strategic analysis, here, we will not use the term “production strategy”, but we will use the concept of “rationalisation of production”:

- **Rationalisation of production** - representing sources and mechanisms of efficiency, bearing in mind the conditioning elements of a market sector, and the capacity to analyse, formalise and operate them as tools and organisational and managerial methods or in terms of decision making instruments.

Two other reasons can help explain this option. The concept suggests an all-inclusive significance, inasmuch as it considers, at the same time, the “production function” and other services that intervene throughout the production, as well as other agents of the project. It

also disposes of a component associated, at a tactical level, to decision making, to the firm establishment of previous options and to changes in the company's organisation and management structure. The sector's environment is also an essential aspect of the concept.

In view of this, the challenge was to identify and characterise NFRP, or ways, according to which, firms dealing with building construction could effectively carry out the several stages of the task, in order to be better placed competitively within their operational markets. In the course of representing the NFRP, we set off by identifying the key efficacy factors conditioning competitive strategies employed by the firms.

For this reason, the Porter (1986) and (1991) methodology of the chain of values was employed. This represents the breaking-down of work carried out by the firm in activities related to the viewpoint of competitive strategy conducted, either by a primacy in terms of cost leadership, or by differentiation. It serves to identify activities which "aggregate value" either to the process or to the product. This is the essential factor in understanding the pattern of costs and in identifying existing and potential sources of differentiation.

Two "imaginary" chains of values were then suggested, one of a standard Brazilian firm, operating as a housing promoter-constructor, and one of a standard French "entreprise générale" (general contractor).

The chain of values comprises other agents besides the building construction firm and considers the up stream activities of the project (e.g., designers) and the down stream activities (external chains of subcontractors and industrials or materials producers).

In accordance with Porter, the various activities that are part of the value chain can be assembled into families of two different natures: those of principal activities – Commercial, Conception, Budget, Preplanning, External Logistics, Logistics of Building Site Supplies, Production and Post-Occupancy; and support activities - Management Control, Management of Human Resource (H.R.), R&D, Management of Quality, Communication and Informatics.

Each of these families of activities can be split into isolated activities or "value creating activities" when related to a key factor of efficacy, when representing an important fraction of costs, or still more, when it indicates a high impact over the differentiation. Examples of key factor of efficacy that we have identified are: to possess low, and totally known costs; to improve the quality, by the reduction of the wastes and of the no-quality costs; to increase the productivity; to develop new relationships with subcontractors and suppliers; to develop new politics of human resources; to capture the customers offering differentiated services; etc.

## **NEW FORMS OF RATIONALISATION OF PRODUCTION**

Porter (1986) demonstrates that the activities of the chain of values are dependent on each other. There are interconnections between them, these can be identified and controlled. Thus, it is important, from the viewpoint of competitiveness, to examine the several principal activities and identify the links between the activities of the chain and the resulting processes.

Once processes were identified and analysed, they were combined to adjust various key factors of efficiency, defining a set of sub-chains. It was perceived, from case studies and bibliographical analyses, that the strategies employed by better developed companies, ultimately concluded that it would be preferable to consider certain key factors of efficacy,

which might be due to their own history and characteristics or a pre-established option concurrent with an internal “vocation”.

Therefore, starting off from key factors of efficacy and from sub-chains or from identified processes, as well as taking into account this practical confirmation, a typology of NFRP was proposed, which, as illustrated in Table 1, could be put in practice by Brazilian and French building construction firms.

Table 1: New Forms of Rationalisation of Production – NFRP

GENERIC COMPETITIVE STRATEGY	New Forms of Rationalisation of Production	
	BRAZIL (housing promoter-constructor)	FRANCE (entreprise générale)
OVERALL COST LEADERSHIP	SIMULTANEOUS ENGINEERING	SIMULTANEOUS ENGINEERING
	SOCIO-TECHNICAL	SOCIO-TECHNICAL
	MANAGEMENT BY FLOWS AND PARTNERSHIPS	MANAGEMENT BY FLOWS AND PARTNERSHIPS
	TECHNICAL-COMMERCIAL	————
DIFFERENTIATION	TOTAL QUALITY	TOTAL QUALITY
	GLOBAL REDUCTION OF TERMS	GLOBAL REDUCTION OF TERMS
	OFFER OF SERVICES	OFFER OF SERVICES
	FINANCIAL AND COMMERCIAL	COMMERCIAL

What are the essential differences? The logical components intended in each are different, since two principal aspects can characterise them. The first is that every NFRP is strongly related to a restricted number of more significant families of principal activities. Every NFRP transmits, in truth, a possible “vocation” or “strong point” of the firm, related to a phase of the project.

Whereas the second aspect, more relevant than the precedent, is that every NFRP appears as an answer to well defined key factors of efficiency. In other words, to every possible path when the firm could be termed as efficient – expressed by dealing with a set of key factors – there more strongly corresponds a NFRP.

Further more, the typology of NFRP was tested, both in France and in Brazil. For instance, Table 2 illustrates the results of the observed strategies in this late country, where eight enterprises were examined. The methodology of investigation included interviews with production and commercial managers, site visits, document analysis, etc.

Tables 3 and 4, that are both findings of the research, illustrate the different proprieties of the NFRP, when the building firm integrates part of the construction activities (the “heavy structures” - structure and sealing), as it is usual in Brazil (general contractor) and in France (entreprise générale).

Table 2: Brazilian Entreprises' Strategies and the NFRP

ENTREPRISE	PRODUCTION (M <sup>2</sup> /SQF - 1988-92)	BRAZILIAN RANKING (1995)	NFRP
ENCOL	482,286 / 5,191,453	1	SOCIO-TECHNICAL
HOCHTIEF	106,782 / 1,149,429	16	OFFER OF SERVICES
MÉTODO	121,673 / 1,309,720	13	GLOBAL REDUCTION OF TERMS
RACIONAL	46,618 / 501,808	60	GLOBAL REDUCTION OF TERMS
ROSSI	106,409 / 1,145,414	17	TECHNICAL-COMMERCIAL
SCHAIN CURY	86,269 / 928,622	25	TOTAL QUALITY

Table 3: Characteristics of the Different New Forms of Rationalisation of Production,  
in the Case of a Competition by Overall Cost Leadership

<b>SIMULTANEOUS ENGINEERING (Low Costs Position)<sup>2</sup></b>
<p>A kind of rationalisation focused on relationships with designers but implies a predominant capacity of the former to present design innovations in the concept of the "product-building". On the basis of such strategy are the gains in costs it allows due to the early integration of the production needs (and of the operation), from the design phase (gains from better product quality, process, or productivity of the system due to meticulous preplanning)</p>
<p><b>KEY FACTORS OF EFFICACY THE SIMULTANEOUS ENGINEERING STRIVES TO SATISFY</b>            Cost must be low and fully known; quality must be improved (reduction of overspending and cost of lack of quality); boost in productivity.</p>
<p><b>ESSENTIAL POINTS TO CONSIDER</b>            Two aspects emerge: the intervention of the company during "product-building" and the availability of tools for calculating the project costs. The company must intervene together with the designers in order to integrate up stream the technical and economic conditioners associated to the implementation of the work and its operation. Likewise, the company must calculate the costs of the projects now being developed, along their various stages. It is also desirable that there should exist capacities of identification of sources of costs as well as the capacity to evaluate the costs of a given decision. Moreover, the company must act together with the industrial suppliers so as to incorporate their capacities, during the desired Conception and Preparation Studies / Preplanning Phases.</p>
<p><b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b>            The establishment of internal communication product/process channels that connect to designers and industrial suppliers (external production process channels) as well. Allowing the updating of data on projects as information becomes more precise. The implementation of studies involved in the preparation: of difficult points, of stages in the execution and of the projects for production. The introduction of a Management Control ensuring the connection between Budget and other main activities of the company (especially Conception and Production), and verifying the efficiency of the previous studies shown above.</p>

<sup>2</sup> "Simultaneous engineering" also appears to be a form of rationalisation, which associates itself, preferentially, to a competitive generic strategy by differentiation (by global reduction of terms of time), dealt in Table 4.

<b>SOCIO-TECHNICAL (with “internalisation”)<sup>3</sup></b>
<p>A kind of rationalisation specially centred on the production system and implying the “internalisation” of the production. It allows gains over costs because of the mastering of techniques and building methods and close attention to the work force of the production. Such mastering entails, at the same time, skill linked to the carrying out of the tasks themselves, as well as, to logistics (supplies and operational flow) and to the management of the work force. It also suggests the establishment of a quality system and the use of tools and methods in order that quality be improved.</p>
<p><b>KEY FACTORS OF EFFICACY THE SOCIO-TECHNICAL STRIVES TO SATISFY</b></p> <p>Assuring low and fully known costs; increase quality (reduce wastefulness and non-quality costs); raise the productivity; develop an H.R policy giving priority to quality and training, employing new forms of labour organisation capable of improving relationship between capital and labour.</p>
<p><b>ESSENTIAL POINTS TO CONSIDER</b></p> <p>The first aspect is, obviously, the mastering of techniques / methods, appearing as a <i>sine qua non</i> condition for the obtention of a high productivity and, as a consequence, lower costs. Associated to such mastering are essential conditions of preparation and organisation / management of labour. The management of the logistics of supply of materials and components (External Logistics) suggests an activity in co-operation with the industrial suppliers, in such a way as to integrate their capacities along the stages of Conception (technological innovation) and of Supplies (finishing structures). On the other hand, the management of the physical flows (Logistics of Building Site) combines with the management of “points in common” between the agents / services, also with the physical management of the working place and with research of dysfunction sources, both directly influencing and conditioning the management of the supply logistics. The development of new methods of construction and new tools and equipment, occasionally in collaboration with the industrial suppliers is, likewise, another fundamental aspect to be taken into account. In conclusion, objectives such as the reduction of wastefulness and of done over again labour having been arrived at with the complementary aid of the implantation of a quality system, as well as the utilisation of tools and methods for an improved quality should crown with success this form of rationalisation.</p>
<p><b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b></p> <p>The conclusion of studies related to the preparation / preplanning. The attention set on given points related to External Logistics and the Logistics of Building Site: the establishment of links between these and the Management of Quality as well as the Production and the establishment of a purchasing service to which efficiency is no longer associated to the idea of the “paid price” but to the negotiated conditions of “co-development” and of supplies linked to Logistics. Two transversal activities associated to Management of Quality are essential: the establishment of a quality system and the utilisation of tools and methods for improving quality. A Management Control to check the effectiveness of Logistics (interruptions of the flows of supplies and information) is equally desirable. The activities related to the H.R. Management (training, qualifying, fixation, working conditions, work contents) will obviously become essential. Lastly to develop new building methods and new tools and equipment, the establishment of a link between Conception, Preparation Studies / Preplanning and R&amp;D are deemed to be fundamental (with the “co-development” with suppliers).</p> <p>The establishment of good relationships (eventual partnerships) and of an efficient communication system between the company and the industrial suppliers (structure and sealing).</p>

<sup>3</sup> It refers, here, to the “internalisation” of the carrying out of the tasks related with the so called “heavy structures” (structure and sealing).

<b>MANAGEMENT BY FLOWS AND PARTNERSHIPS (with “externalisation”)<sup>4</sup></b>
<p>A rationalisation form centred on the production system, yet suggesting the “externalising” of production. Subcontractors will thus become as agents that carry out top quality functions (becoming likely partners of the firm). It involves obtaining gains in costs no longer depending on the command of technology and of constructive methods, but due to a well developed management capacity in terms of operational flows and the information circulating as the work progresses (management of formation at project level, “points in common” among agents, its own manual labour, of subcontractors, suppliers, critical construction site juncture dates, time terms, quality).</p>
<p><b>KEY FACTORS OF EFFICACY THE MANAG. BY FLOWS &amp; PARTNERS. STRIVES TO SATISFY</b>          Develop forms of rationalisation focusing on technical development and management of production, meanwhile analysing relationships with industrial suppliers, suppliers in general, and subcontractors.</p>
<p><b>ESSENTIAL POINTS TO CONSIDER</b>          One of the first characteristic of this form of rationalisation is upgrading the up stream phases of Conception and Preparation Studies / Preplanning, even though these do not attain the scope of SIMULTANEOUS ENGINEERING. Nevertheless, it is in the management of physical flows (Logistics of Construction Site) that can be found one of the key points of this form of rationalisation (management of “points in common” among agents / services, physical management of the work site, study of the sources of dysfunctions). The success of this form of rationalisation depends, in equal parts, on the capacity of organisation and the management of the company’s own production labour force itself (structure and sealing) as well as the management of the subcontractors. Forms of co-operation such as partnerships, especially with subcontractors, seem to be essential. In order to be competitive, the firm has to improve its own efficiency as well as the efficiency of its agents.</p>
<p><b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b>          The set up of communication channels between Conception, Preparation Studies / Preplanning, Logistics and Production (inner channel of communication product-process to which are linked the outer channels, of which subcontractors especially are a part). The conclusion of studies related to the preparation and implantation of a Management Control to verify the effectiveness of the above and the logistic <i>focus</i> (interruptions of the flows of supplies and information)          The set up of adequate relationships and of an effective communication system between the firm and the designers (outer channel of product and process). Nurturing good relationships and an effective communication system between the firm and the industrial suppliers (structure and sealing) and the subcontractor (finishing structures) (eventual partnerships). Relationships between these agents should concern everybody; they should occur in such a way that everyone should find them expedient, in accordance with a form of mutual co-operation.</p>
<b>TECHNICAL-COMMERCIAL</b>
<p>As the term suggests it is a form of rationalisation combining technical and commercial aspects. Because of the conditioning factor of scarce resources and lack of “official” financing, the building promoter will direct himself to auto financing. This demands the setting up of a focus that would permit longer time-terms for construction sites, resulting moreover in a minimum size for the operations.</p>
<p><b>KEY FACTORS OF EFFICACY THE TECHNICAL-COMMERCIAL STRIVES TO SATISFY</b>          Dispose of alternative financing mechanisms; develop forms of rationalisations to permit the adequate levelling of production teams.</p>

<sup>4</sup> It refers here, at least, to the “externalisation” of the execution of services related to building systems and to the so called “finishing structures”, the firm reserving for itself the execution of the “heavy structure”.

<p><b>ESSENTIAL POINTS TO CONSIDER</b></p> <p>There are two aspects that appear to be central to this form of rationalisation. In relation to these, what concerns us here is related to the setting up of operations of a minimal size, when we would be able to afford to work with a wider margin of time, when this would, however, not entail a rise in costs. A well escalated start of the time of several fronts of work within the same “large” operation, entails therefore, the possibility of obtaining an adequate levelling of the production teams (whether pertaining to the company itself or to the subcontractors) which, if the forms were any different, would not be able to operate in an economical manner. A preparation of a well developed logistic management, together with an organisation of an efficient work force (which, with the help of subcontractors, the firm relies on) as well as, a well conducted management of subcontractors, become therefore of capital importance.</p>
<p><b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b></p> <p>The establishment of communication channels between Preparation Studies / Preplanning, Logistics and Production. The completion of studies for Management Control to verify their effectiveness and of the logistics (interruption of flows of supplies and information).</p> <p>The establishment of good relationships with industrial suppliers (structure and sealing) and subcontractors (building systems / finishing structures).</p>

Table 4: Characteristics of Different New Forms of Rationalisation of Production, in the Case of Competition by Differentiation.

<p><b>TOTAL QUALITY</b></p>
<p>Form of rationalisation, whose major goal is to offer clients a product which presents qualities as “product-building”, as well as inherent qualities of the completed built object. It refers, in the first case, to those qualities which satisfy the needs of the clients and of society in general and that can involve a wider <i>spectrum</i> of requirements, such as aesthetics, respect of the environment, integration in the social and urban environment, and furthermore, of those qualities particularly functional, such as adaptability of the building, the standard of the finishing, the obedience to the proposed plan, and so on; the second case concerns a quality associated, in particular, to the durability of the products employed and to the reliance that can be placed on the planned and completed built systems.</p>
<p><b>KEY FACTORS OF EFFICACY THE TOTAL QUALITY STRIVES TO SATISFY</b></p> <p>To conceive a product and build with quality.</p>
<p><b>ESSENTIAL POINTS TO CONSIDER</b></p> <p>The first goal is to assure that the aspects linked to the quality of “product-building”, as well as to those associated to the inherent characteristics of the built object, will be considered from the conception of the latter. This should happen both internally (along with determined services of the company) and externally (together with the designers). Soon after, all operations along the site will progress trying to obey the specifications, technical regulations, and requirements linked to quality, in order to assure the reliance and durability of the built systems. In this very context, an integrated approach of quality-security is vital. The management of physical flows is equally important, since it is known that this management associates itself preferentially to the management of “points in common” between agents/services and to the research of the sources of dysfunctions, as it interferes and conditions directly the management of the logistics of supplies (quality in supplying). Its success depends on both the capacity of organisation and the management of eventual subcontractors. Finally, goals of reduction of wastefulness attained by means of the implantation of a quality system and the utilisation of tools and methods towards its improvement, must complete the said form of rationalisation. In this context, the organisation and the management of the manual labour become so important as in the case of SOCIO-TECHNICAL form of rationalisation, differing from the other only in that, in this latter case, they are linked to a competitive strategy by differentiation.</p>

**CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT**

Importance of communication between the Commercial and the Post-Occupancy and the Management of Quality; communication between Commercial, Conception and Preparation Studies / Preplanning (with the collaboration of Production). Creation of a service of purchasing, whose efficiency is linked to the quality of the delivered product. Communication, in the same way, between Logistics and the Management of Quality (with the collaboration of Production). Two transversal activities linked to the Management of Quality are essential: the implantation of a quality system and the utilisation of tools for quality improvement. The implantation of a Control of Management that verifies Logistics (interruptions of flows of supplies and information) is equally desirable. The Management of H.R. (training, skills, fixation, work conditions, work contents) is indispensable.

Definition up stream of clients' requirement in terms of quality. Creation of a system which would assure the return of information related to the degree of the clients' satisfaction. The existence of good relationships with the industrial suppliers and with the subcontractors is desirable, and includes setting up of an efficient system of communication between the company and these agents.

**GLOBAL REDUCTION OF TERMS OF TIME**

Form of rationalisation, whose main goal is to attract the clients because of its capacities of organisation and of dealing the projects which permit gains in time or global reduction of terms of operations. Its principle is to intervene, at the same time, in the up stream stages, linked to the conception, and in those down stream stages, linked to the construction site.

**KEY FACTORS OF EFFICACY THE GLOBAL REDUCTION OF TERMS STRIVES TO SATISFY**

Develop forms of rationalisation, which would permit the reduction of total time terms of the project.

**ESSENTIAL POINTS TO CONSIDER**

The essential points are rather subtle and include aspects of the other above-mentioned forms of rationalisation. Thus, the form under discussion re-acquires from the **SIMULTANEOUS ENGINEERING** the principle of intervention of the company at the moment of its creation, but, in turn, it integrates up stream the technical conditioners which can bring gains in terms of time. The premise of the work in co-operation with the industrial suppliers, in order to integrate their competencies, both in the phase of Conception as well as in the phase of Preparation Studies / Preplanning, remains valid. To this are added the profits that these agents can give to External Logistics. It also combines aspects of **SOCIO-TECHNICAL** forms of rationalisation and **MANAGEMENT BY FLOWS AND PARTNERSHIP**, placing as its main goal long term gains. It is in this context that the mastering of the techniques / building methods and the imperatives of organisation and of management of the company's own manual labour appear as a *sine qua non* condition for the attainment of high productivity, and, as a result, for the acquisition of long term gains. The same observation is valid in the cases of management of physical flows (Logistics of Construction Site) and the capacity of management of subcontractors. Forms of co-operation as partnerships with the subcontractors are desirable. Finally, the vertical down stream integration (the internal capacity of producing components) appears as the last facet of this form of rationalisation.

**CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT**

The set up of communication channels between the Conception, Preparation Studies / Preplanning and R&D (taking into consideration Logistics and Production, as well as external partners - designers, subcontractors and industrial suppliers). The capacity of vertical down stream integration (prefabrication). Creation of a purchasing department, whose efficiency would be associated to the supplies (terms of delivery and quality of delivered products). The implantation of a Control of Management to verify the efficiency of Logistics (interruptions of flows of supplies and of information) is also desirable. The activities related to Management of H.R. (training, qualifying, skills, fixation, work conditions, work contents) are indispensable.

Good relationships, as well as of an efficient system of communication between the company and the designers, and between the company and the industrial suppliers and subcontractors.

<b>OFFER OF SERVICES</b>
Rationalisation Form where the major objective is to attract clients by means of the offer of different types of services by the construction firm, all along the course of the project.
<b>KEY FACTORS OF EFFICACY THE OFFER OF SERVICES STRIVES TO SATISFY</b> Attract the client with the offer of different services.
<b>ESSENTIAL POINTS TO CONSIDER</b> The points are, at this stage, a direct function of the type of proposal made to the client, and derive indirectly from the forms of rationalisation that are associated to a contest over costs. For instance, as it employs aspects of the rationalisation form of SIMULTANEOUS ENGINEERING, the company is able to acquire an added value through its capacity to intervene at the moment when the product-building is constituted, in such a way that it will integrate its know-how and set the lowest value on the operational costs of the enterprise; a firm grasp of the Preparation Studies / Preplanning could, in the same manner, offer the clients an important advantage. From the SOCIO-TECHNICAL form of rationalisation, it can in the first place utilise its organisational and managerial skill of H.R. to compose a competitive advantage; its competence in terms of logistic management of supplies, as well as the development of new methods of construction and of new tools and equipment seem, by the same token, points to be made the most of with clients. Now the competence in the management of flows, or the establishment of relations of partnership with subcontractors can be considered as points to assess starting off from the utilisation of aspects of the rationalisation form MANAGEMENT BY FLOWS AND PARTNERSHIP. In conclusion, the company can adopt the TECHNICAL-COMMERCIAL rationalisation form in order to offer something more in terms of its competence to equalise the level of the production teams, be they the firm's own or subcontracted.
<b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b> They are a direct function of the kind of advantage offered to clients and follow conditions of homologous FORMS OF RATIONALISATION.
<b>FINANCIAL-COMMERCIAL</b>
We are dealing, for the first time, with a form of rationalisation that has nothing to do with the system of production, since it is centred more upon an aspect that at the same time is both financial and commercial: the offer of financial aid to the clients, to help in the acquisition of home units. It therefore offers almost no special interest in relation to this analysis.
<b>KEY FACTORS OF EFFICACY THE FINANCIAL-COMMERCIAL STRIVES TO SATISFY</b> Availability of different financial mechanisms.
<b>ESSENTIAL POINTS TO CONSIDER</b> This is quite an objective bet: offering the purchasing-clients a financial plan that would bring life to the purchase of home units.
<b>CONDITIONS SOUGHT WITHIN THE COMPANY AND DURING THE PROJECT</b> Conditions do not affect the production system; they are, therefore, not under discussion here.

## CONCLUSIONS

The principal conclusions of the research, when underscoring the Brazilian situation are:

- Environmental alterations and market transformations have led, both in France and Brazil, to the appearance of NFRP.
- The twin dimension of NFRP: of the translation of factors of effectiveness and efficiency in the changes of the socio-organizational model.
- NFRP demand a new management policy of human resource and a renovated policy of subcontracting.

Finally, even if the concepts of the Lean Construction were not used in the research, it is clear that there is a very important correspondence between the obtained results and the statements of this current of thinking, that justifies the presentation of this paper.

Due to the limitations in length of this paper, we here developed only the two first conclusions further.

### **1. Environmental Alterations and Market Transformations Have Led, both in France and Brazil, to the Appearance of NFRP**

The first element of conclusion is that the orientation of construction firms in relation to NFRP also outlines itself in Brazil, despite the fact that it is more recent than in France. The consequence of environmental transformations in both countries indicates marked points of resemblance. The most relevant aspects are of the same nature. By reasons of environment that are increasingly varied, more unstable, more competitive, the quest for an increase in efficiency to become effective, is turning out to be a common goal. In fact, although there exist obvious differences between the competitive French and Brazilian models, the economic aspects linked to the market and to competitors seem to be so visible that they end up by getting, the rationalisation modes of the two countries, to converge.

On the other hand, there were differences in the effective handling of NFRP, of the tactical part, associated to the creation and to the utilisation of tools and methods of organisation and management. These actions are dependent on peculiarities that are not local merely at the meso economical level but also at the “micro” level of the companies.

This is indicative that the possible answers within the field of productive strategy depend especially on peculiarities associated to the nature of the activity of the construction. This is true even if, in a particular country or region (in the case of Brazil), the conditioning factors of the local sector as well as the rules that condition competition among companies should influence them.

### **2. The twin dimension of NFRP: of the translation of factors of effectiveness and efficiency in the changes of the socio-organizational model**

The second conclusion is that, especially in the case of Brazil, the NFRP must be examined in the light of two types of changes: (1) the change of the factors and mechanisms that result in efficiency and effectiveness as a direct consequence of market and environment transformations in their multiple dimensions (social, economical, technological, financial, legal, political and so forth); (2) the changes that occur, in a parallel way, in the organisation models of the companies and of the sector.

Therefore, on the one side, the building sector crosses the same changes of paradigm as the industries in relation to factors of efficiency and efficacy. The NFRP reflect new environmental demands in terms of quality, costs, terms of time, diversification and integrate, as well, new mechanisms that permit productivity gains. Firms, in their attempt to become efficient must integrate a technical efficiency in a much harder way than they did in the past. The fact that Brazilian firms started to carry out acts targeted at dominating methods of production, preparation of the construction site, training and qualification of the manual workforce are proof thereof.

On the other hand, there have been occurring changes in the organisation of the model, in the building sector, principally in Brazil. This has also occurred in relation to the organisation of the production. These modifications are the consequence of a greater complexity of the systems of production and of the need for integrated information. In the first case, the changes manifest themselves through actions such as the integration of productive phases to ensure well matched and simultaneous tasks, for the organisation in “production teams”, for a greater number of mounting operations in construction sites, and so forth; in the second case, by the valorisation of aspects associated to Logistics, or even for the utilisation of E.D.I.

Moreover, several tendencies of a social order towards change are common to the sector of building construction and industrial sites. Examples of this are the growing need for co-operation and communication and the new programming and production control models that take into consideration the inter-activity and inter agent relationships. Studies for a common language, transversal to the project, are some of the difficulties shared by the two sectors.

Lastly, in the case of changes of an economic order, the manifestation of new demands by the clients also constitutes a point in common. The variety, the personalisation, the innovation, the quality, the demand for services, the reduction of time terms and costs are manifestations of this tendency. The consequences are a gain in importance of competition modes through differentiation and the practice of TQM.

## REFERENCES

- Betts, M. and Ofori, G. (1992). “Strategic planning for competitive advantage in construction.” *Constr. Mgmt. and Economics*, London, 10:511-532.
- Campagnac, E., Bobroff, J., and Caro, C. (1990a). *Approches de la productivité et méthodes d'organisation dans les grandes entreprises de la construction* (Approaches of the Productivity and Organisational Methods in Large Construction Enterprises). Plan Construction et Architecture. Paris, METT/PCA, March, 218 pp.
- Cardoso, F. (1996). *Stratégies d'entreprises et nouvelles formes de rationalisation de la production dans le Bâtiment au Brésil et en France* (Entrepreneurial Strategies and New Forms of Rationalisation of Production in the Building Construction Sector of Brazil and France). PhD Diss.. France, École Nationale des Ponts et Chaussées, January, 476 pp., Financial support: CNPq.
- De Terssac, G. and Dubois, P. (sous la direction de) (1992). *Les nouvelles rationalisations de la production* (The New Rationalisations of Production). Toulouse, Cépaduès, 290 pp.
- Porter, M.E. (1980). *Competitive Strategy*. USA, Free Press.
- Porter, M.E. (1986). *L'avantage concurrentiel*. Paris, Intereditions. 647 pp.
- Male, S. and Stocks, R. (eds.)(1991). *Competitive advantage in construction*. Oxford, Butterworth-Heinemann, 479 pp.