



## **EVALUATION OF PRODUCTION IN SEASONALITY PERIODS: ANALYSIS OF THE CONSTRUCTION INDUSTRY IN BRAZIL**

*Marcos William Kaspchak Machado*

*Federal Technological University of Paraná - Brazil*

*E-mail: wkm@marcoskaspchak.com.br*

*Pedro Paulo Andrade Junior*

*Federal Technological University of Paraná - Brazil*

*E-mail: pedropaulo@utfpr.edu.br*

*Submission: 22/02/2013*

*Revisions: 08/03/2013*

*Accept: 30/04/2013*

### **ABSTRACT**

*The present work has as an objective to evaluate the impacts of production seasonality in seasonality periods in the Brazilian construction industry. The adopted methodology was based on the qualitative and quantitative approaches of the aspects inherent to the seasonality factors in the construction industry and its possible causes. Besides that, literature data were collected in year report books and devices provided by institutions of the sector. The results demonstrated the importance of production management mechanisms to optimize the use of productive factors through cost analysis, which are fundamental to understand the operational flow of resources used in the operational media. Obtaining this information, connected to market indicators helped in the decision making process related to the development of prospective scenarios which will give support to the decision making strategy aiming to stabilize the production levels.*

**Keywords:** Seasonality, Costs management, Construction Industry, Performance indicators.

## 1. INTRODUCTION

The ability to foresee scenarios and perform strategic changes in the corporate world is decisive factors in companies' growth. Each organization has, according to its size or medium, a differentiated way of understanding the competitive environment in which it is inserted e how it will act in a Market, according to commercial acting patterns and management of the available resources.

Since the insertion of the mass production system which owes its success to the applicability and foresee ability of the environment, besides the expansion of the consumer market and the abundance of hand labor (HELAL, 2005), the production management model is guided by the high output and consequent reduction of unitary fixed costs. However, with the increasing technological evolution and the bigger tendency to entrepreneurship, the market has become extremely competitive and other factors have emerged for the organizations management. Now, more than never, the management of competitive differentials has become the basis for success. Nowadays, there is the need for companies to work strategically with the production outputs according to demand and its scope of the market share, defined by commercial policies. Besides producing, it is necessary to be aware of the future production outputs, operation costs and how to improve the performance of the supplier chain in order to make the operation flow more stable and prospect horizons in which to act.

According to Ilo et al (2004), the companies' competition power and attractiveness is connected to the capacity of innovation of productive processes, proper company management to the organizational environment and human resources, besides external factors such as government actions on the economy, local attractiveness measures, amplification of credit to investors and entrepreneurs and the globalization of information. Thus, according to the author, competitiveness is the level of capacity of the organization to efficiently the influence of these measures in its internal environment.

However, this stability in the processes depends on external factors. Along an organization's life cycle, it experiences an influence in its production output levels and in the adequacy of the operational and strategic decision making process. Bittencourt (2010) says that when seasonal production scenarios are considered, the development of an economic dimensioning systematic of the production capacity

which simultaneously encompasses the analysis capacity, the stock management process in seasonal environments and the investment alternative evaluation, are justified for improving and making the decision making process more reliable (ABREU et al., 2004). Thus, the use of financial analysis and projections tools take on the role of providers of the reliability necessary to a strategic decision.

In this manner, this article aims to identify the organizational and market factors, which interfere in the management of seasonal production in the construction industry. To achieve this objective, this article aims to specifically describe the importance of the construction industry in the national economy by explaining its seasonal production aspects; point out the data strategic management tools which can provide proper managerial information and in due time for the decision making process to be able to reduce discrepancies found in seasonal production media; measure the interaction factors between the commercial and production decisions in the field of construction and finally, demonstrate the seasonal costs reduction capacity inherent to this activity through production management.

## **2. LITERATURE REVIEW**

### **2.1 Construction industry: economy context**

The segment of construction is one of the bases for direct insertion of capital in the economy and is directly linked to macroeconomic factors of job generation, government expense evolution and reduction of taxes and interests for the investors.

Even if connected to factors of the national economy, according to Leite (2004) with inflation indexes controlled, the profits are not purely financial and are a consequence of good management of the execution of projects. Besides, the competition among construction companies has become harder and harder and therefore, many companies have turned their focus to internal management factors in order to optimize their processes by reducing costs and taking advantage of their competitiveness towards competitors.

The strategic management of resources, when well applied, can become a factor of financial gain through cost reduction. For the planning of inflation of production factors, the construction industry uses the National Index for Civil Construction (INCC), which is measured by the Getulio Vargas Foundation. Through the analysis of this index composition, it is possible to observe the role of each

component in the composition of operational costs. In 2011, according to an IBGE survey, as shown in figure 1, the construction industry participated in the Brazilian Gross National Product with 4.93% of the total of current values and represented 7,60% of generated jobs, acting strongly for income distribution. The participation of the sector in the economy has been in a boosting period which was fostered by the increase of credit lines for investors and the general public, which has resulted in increased consume. The data obtained from the Investment Report of BNDES in 2011 shows a credit line of R\$ 7,6 billion, being this value 76% greater than the one of the previous year.

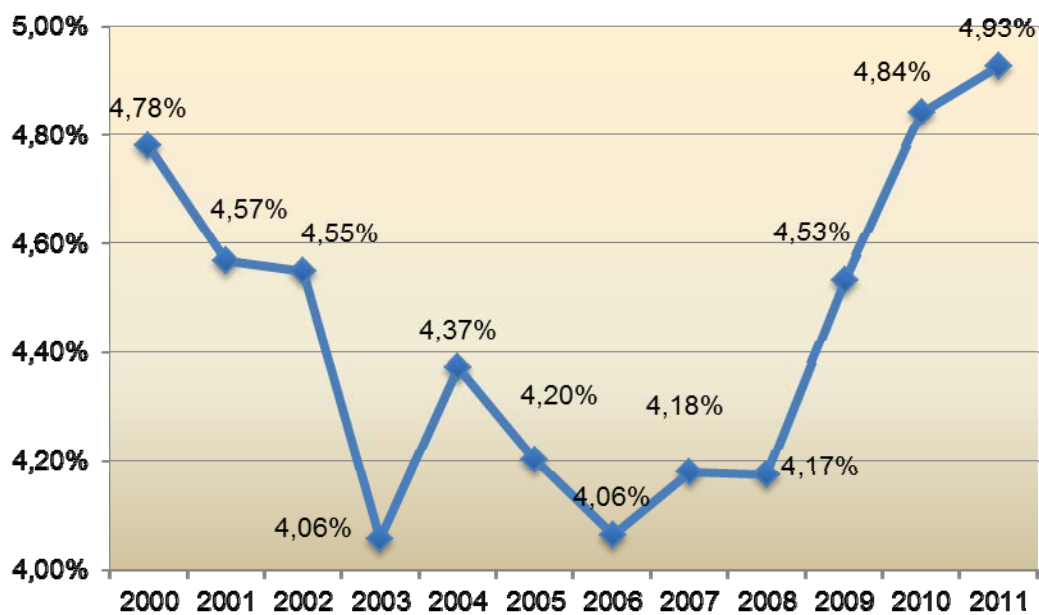


Figure 1 - Share of Construction in GDP  
Source: IBGE – National Accounts

Besides an increasing participation, the sector has presented an evolution in the volume invested in infrastructure projects. There has been an evolution of 262% (Figure 2). This is due to, besides the natural growth of the Brazilian economy, to the interest of investors and entrepreneurs to join great returns attached to gain over production factors and low risk, since with the evolution of participation and the volume comprehended, a demand is generated in a sector lacking qualified technology and hand labor.

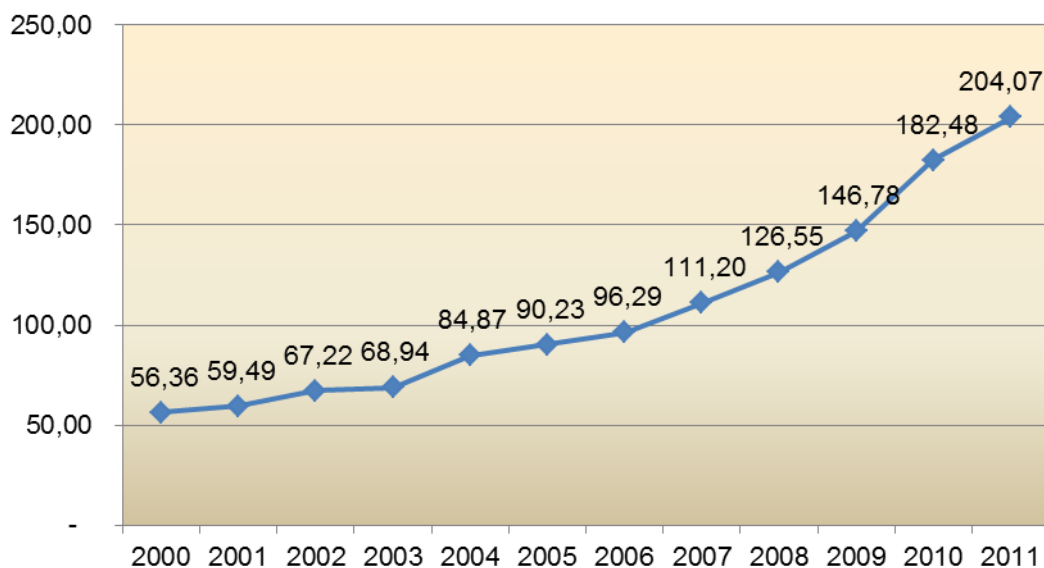


Figure 2 - GDP Construction – Current values (R\$ billion)

Source :: IBGE – National Accounts

As Ilo et al. (2004) reports, “the construction industry, for being an industry permeated by high levels of manual work and standardization of some procedures, ended up at the margin of the automation and flexibilization process”. In a scenario of technological deficiencies and low levels of advanced management processes, companies must focus in their differential because any advantage factor in the market will make them to be positioned favorably, thus optimizing their market share.

The standardization, even if inefficient, can bring an accommodation of the production mechanism management, once in the view of many business men, innovation has dubious return in the long run. Therefore, the aid of internal and external indicators shows fundamentally the importance of flexibilization of commercial processes and the insertion of new technologies to perfect the productive cycle.

According to Muñoz and Quitella (2000) there is an incongruity between the importance of the construction industry in the national economy and the importance managers of such companies give to the long term strategic process of productive and management means, making such processes out-dated, not competitive and generators of much loss and waste.

Furthermore, the author also states that planning is not used much in the sector, allowing immediate decision making and only considers the situational factors

available to management. This is due to the disarticulation between the Project and the execution and to limited planning of the productive process.

Part of this disarticulation is due to the little knowledge of management in all hierarchic levels, which encompasses the project execution. Besides that, the communication process becomes inefficient in these levels, once there is no compatibility with the instruction level of the people involved. Therefore, productivity, which is defined as the acquisition of more expressive results in a shorter period of time, will always be in a dissatisfactory level in relation to organizational needs in part, due to time loss with corrections and adaptations.

### **2.2 2.2 Indicators' Seasonality**

For it is a basic sector for infra-structure projects for governmental insertion as well as for the investment in building projects, this area of the economy is attached to macroeconomic indicators which demonstrate the economy growth variations and inflation indexes. Besides that, Silva (1999) show that "each organization, faced with the need to define action strategies, orients itself by the environmental context at a level best suited to with its trajectory". Therefore, if the sector presents dependence on macroeconomic factors, these must be evaluated by managers during the decision making process.

According to Valentim (2002), organizations use, besides internal indicators, "data, information and knowledge produced externally to them which foster a better performance in the market in which they play". Among others, the author mentions strategic are used by the high management and facilitate the definition of strategies through directives, social policies, action lines, institutional plans and projects; market: enable the high management as well as the commercial area to perceive business opportunities in the internal as well as in the international market; financial: make it possible to the financial area professional to process cost, profit, risk and control studies; commercial: supports the commercial area in import and/or export materials, services and products, as well as supports the legal area in relation to legislation in the country in which the commercial transaction is established; statistics: support the strategic, financial, commercial and P&D, by identifying in percentage and/or numeric terms issues connected to the organization business, such as export indexes, import, market demand and restriction, economic indexes,

purchase power, GNP, unemployment rates, balance of trade and internal investment indexes.

In order to make the cost system more foreseeable, companies can adopt a cost accumulation forecast system. The participation of each of its production cost factors in the cost of its final product, must be measured. Once with those data in hand, managers can apply inflation prospection in their factors, thus creating post adjustment cost scenarios. In so doing, it is possible to work with price policies and production volume, which will reduce the impact of production, costs in the short term, or by smoothing through the optimization of the production volume the unitary costs, through the unitary fixed cost and maintaining the same sale price.

It is also possible to observe that despite the fact that the macroeconomic indicators follow patterns and tendencies, according to Assunção (1996) "considering the resemblance between building, built with the same building process" indicator such as average building costs (R\$/m<sup>2</sup> of built area), hand- labor global productivity (Hh/m<sup>2</sup> of built area), costs and consume of raw material per service broadly used by the company in this sector, must also be subjected to analysis. Thus, organizations can evaluate their indicators by taking the sector general indicators as a reference, which are obtained through surveys performed by representative organisms institutions. Besides that, companies can provide parameters or project prototypes, thus defining indicators which can, according to the author, to be used to "compose scenarios for analysis of production behavior" through the standard indicators developed.

### **2.3 2.3 Cost Strategic Management**

With the communication process suited to the company's positioning and with the support of efficient data transmission, it is the managers' duty to strategically identify and evaluate the process of aggregation of costs to products and services.

Silva (1999) reports the need organizations have to finance all the value chain to understand in which sectors there are possibilities for cuts or better use of productive factors, thus turning this into possible competitive gains. For that to be done, Nakagawa (1991) claims that the root for operational boosting through cost is intimately connected to the establishment of a "company excellence philosophy"



whose objective is to show every collaborator the importance of resource management in the manufacture process and service rendered.

There are several formats of cost evaluation and allocation. However, organizations have been using adjusted methods to their managerial systems, leaving behind all the known traditional systems, because according to Nakagawa (1991), they distort product costs and proper management is subjected to allocation errors which can end up in competitive loss or low return.

In vascularized sectors that encompass a great variety of resources and services, as is the case of the construction industry, it must be observed in a planned manner the whole process, from the signing of execution contracts to the final delivery of the enterprise. For this to happen, it is imperative the proper allocation of resources according to the activities executed in each stage of the productive process by triggering the consumption of resources among these activities. Many times costs amplify in a cascade effect in a productive cycle because they are interdependent. However, interdependent processes can bring deadline competitive advantage and optimization of resources, when totally executed according to the initial planning of the execution cycle.

Another important concept in strategic cost management is the learning curve that is the continuous efficiency gains in the execution of the stages of the productive cycle, which reduces time, consequently the cost of the enterprise. This is essentially due to the specialized hand labor, which continuously adjusts itself in the activities it executes. According to Leite (2004):

The use of the learning curve allows a better dimension of financial resources and greater precision in determining deadlines for execution of the projects. The determination of service prices becomes precise by knowing how much the productivity of this service will increase. The comparison of productivity absolute values between similar works or the simple determination of parameters for productivity enhancement are not sufficient to aid coherent planning. Thus, the possibility to determine a calculation systematic of the services productivity enhancement, will allow their more realistic planning.

Nowadays, companies must focus on cost management, because according to Ilo (2004), "management of all the interfering factors in a product final cost, especially in this new competitive model, with reduced profit margins, in which the production cost defines the result of the company" brings the differentiation companies need to compete strategically.



## **2.4 Modeling of scenarios for demand prospection**

According to Círico (2006), in management, the capacity to prospect scenarios is a skill which must be used to manage future demand and production. The process must create limits that indicate the objective in a practical way, towards which the organization must go in search for results.

As in the case of mining which uses previous knowledge to prospect new ores, it is also important to make use in the business world, an organized and standardized set of past information which will help in the current decision making process in order to influence the future. According to Securato (1993) "there is something connecting past and future which helps us in the decision making process and gives us the capacity for such. We will call that, forecast sensor". As Ferreira (2009) claims, future forecast and the results the decisions can trigger are made all the time.

According to the author, another aspect to be approached is the scientific and technological level of development of the society which contributes in reducing distortions in prospection, that is, reduce risk factors that today's decisions have in relation to the expected future. Ferreira (2009) points out that factors like variable social and economic policies in the short term, government budget disorder, problems with suppliers of raw material to infra-structure suppliers, lack of information about the market and the demand, merely political decisions not related to technical knowledge and little openness to the international market, are determining to increase the uncertainty level about future projects. These measures, besides directly influencing organizations, also affect the whole productive chain and client portfolio, which also depend on these factors to invest or not their reserve investments in infrastructure construction.

Correa et al. (1999) demonstrates that organizations must act according to certain abilities concentrated in the internal demand management. They are the following:

- a) Ability to foresee the demand – it involves the use of proper tools the company has to anticipate demand. They must be used from the sales database, as well as information that explain the behavior of these indexes and how the internal and external variables influence the productive medium. Another appropriate

tool is the market information sampling of the sector to foresee the company participation and try to expand it.

- b) Power of influence on the demand - besides understanding the demand, a company must find ways to influence it positively in order to absorb a bigger market share through the negotiation of deadlines, price reduction or simply by encouraging sales representatives to offer a new product mixes which will bring the maximum utilization of the productivity capacity.
- c) Ability to fulfill deadlines – this ability is very important to maintain a planned and continuous production process, because promising delivery deadlines to clients makes the whole productive medium to concentrate in the chronologic flow of the production to achieve it. Besides, it enlarges the confidence of buyers, a fact that will bring benefits with new sales, thus incrementing the level of future production.
- d) Ability to prioritize and allocate – due to the absorption of new businesses, at a given point in time, the company will have to prioritize one client or another. This decision is important because then, the company will be able to optimize its processes by allocating the resource sources in a way that will reduce idleness.

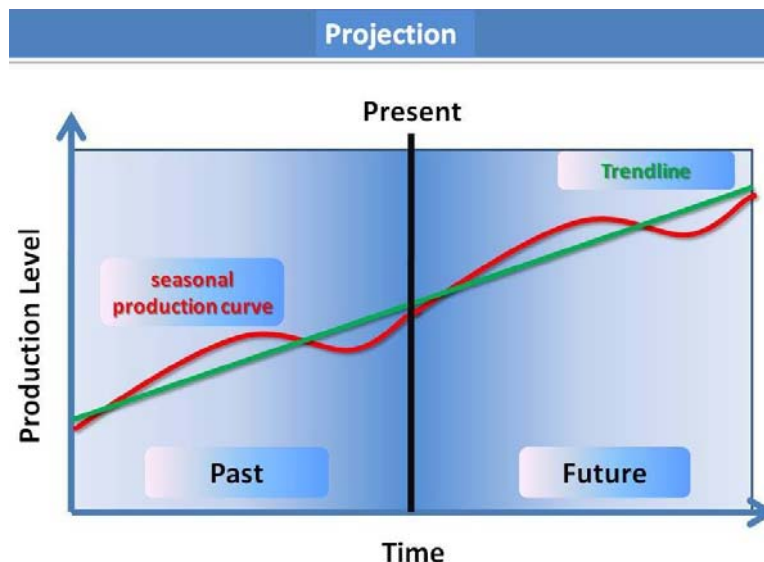


Figure 3 – Projection level production  
Source: Author

Thus, the decisions to evaluate the future must be systematic and objective because they will always influence the economic and financial order of the organization.

Such evaluations about the future scenario can be classified in three ways, according to Correa et al. (1999), depending on the expected future:

- a) Planning – where the future scenario will be designed through the insertion of new tools in the organizational control. For example, the planning for the assembling of a new plant, in which the company has the power to interrupt planning at any time, even if it will cost something in the future.
- b) Prediction – future scenario in which something out of control of the company can jeopardize its planning, like climate or another unexpected reason (VANKATRAMAN, 1994).
- c) Projection – these are evaluations in which it is expected that the future will be a mirror of the past following tendencies and seasonal periods, as shown in Figure 3.

For the forecast to be admissible, it is not possible to use one technique only. However, it is important to simulate scenarios in different ways in order to observe the action range the organization will find in the future.

According to Moritz et al. (2009), there is a convergence of surveys which approach strategic planning about strategic scenarios and the competitive intelligence, once it is possible to make decisions attached and based on the data related to future uncertainties. On the other hand, it becomes harder and harder for companies to compete in the current economic context.

Porter (1992) claims that companies must create different scenarios that use all the information about possible market changes or in its current production and cost structure, through communication on information networks that at the same time distribute and collect important data, which can be used as reference for decisions to be made.

According to Marcial (1999), the simulation of scenarios helps the discussion of some key questions related to the future of companies, besides granting managers a clearer decision-making and of lesser risk. The author still reports that these scenarios foster the identification of opportunities and threats to the business; promote development and the analysis of new future options for the company when facing changes in the external environment. They supply a view of future which

can be shared by the members of the organization". That is, besides being simulated, the scenarios must be object of joint communication and evaluation.

According to Ferreira (2009) "all the variables obtained quantitatively, through historic series or indicators, serve as base to simulate future scenarios for the alternatives to be analyzed. However, as in obtaining results in an uncertain future, there can be or not, probabilities of success or failure as for the results". In order to minimize these risks, the elaboration of scenarios must encompass technical and qualitative matters. The information sampling process for the simulation of scenarios can happen, according to Securato (1993) in the following ways:

- a) Brainstorming – it consists of presenting one objective to a group of people. The variables of influence are initially listed and posteriorly discussed and selected one by one. After that parameters that compose the different scenarios are fixed.
- b) Kinetics – similar to brainstorming but with less people involved, normally specialists in the problem to be discussed.
- c) Specialist - individual analysis by a specialist who determines the parameters and groups them in different scenarios.
- d) Delphi – tries to subject the objective and the variables of influence to a detailed constructive criticism. Once the variables are determined, the work with the scenarios obtained is repeated. In this context, participants do not communicate, that is, there is no influence among parts.

As can be observed, there are several formats to create and evaluate scenarios. The applicability in each organization will be conditioned to its structure and to the objective to be reached, but obtaining these scenarios is important to serve as a reference for the decision making in reducing risks.

### **3. TOOLS USED IN STRATEGIC MANAGEMENT PRODUCTION SEASONAL**

#### **3.1 Performance indicators**

According to Estrela (1998) "the indicators consist of quantitative expressions which represent an information originated from the measurement and evaluation of a production structure of the processes which compose it and/or of the resulting products. The measurement and evaluation refer to the identification of the data and

information and to the establishment of criteria; specifications or values for comparison between the results obtained and defined standards or goals.”

In order to create indicators in a company, it is necessary to point out the processes where the measurements will be performed and the retrieval of the database for analysis. Besides that, it is essential to evaluate how the organizational structure treats the data of the process to be evaluated within the managerial or production hierarchy.

According to Estrela (1998) the processes to be evaluated are those that are prioritized by the company. Based on these processes, indicators can be classified as managerial indicators, those that are created to evaluate the implementation of strategies introduced by the company's board of directors. These indicators evaluate several hierarchic levels and processes that permeate goals from the action plan to be reached. Another group of indicators are the operational indicators, created on the processes or operations executed at the operational level. In order to create the indexes, it is necessary to create a flow chart of the process by identifying the medium applied to the product which will evaluate one by one and observe in which processes the company presents a low productivity level.

According to a PBQP-H(1991) report, indicators must fulfill the following pre-requisites:

- a) Selectivity – must be specifically related to the stages of the process or to the product.
- b) Simplicity – easy to understand, use of simple percentage, average and absolute number variability.
- c) Low cost – the cost of its processing, sampling and evaluation must not be higher than its benefit.
- d) Accessibility – data has to be easily accessed.
- e) Representativeness – must satisfactorily represent the process.
- f) Stability – must last with time, based on routine procedures incorporated to the company's activities.
- g) Tractability – must be easily accessed and the information must be properly documented.

- h) Experimental approach - indicators must be tested. In case of no being really important, they must be altered.

So, it can be seen that the strategic planning of information is not the strategic plan itself, but it is the result expected through the use of tools in the future of the organization and must take into account the organizational mission. The concept of indicators revolves around a strategic management intended to build the route for a desirable future for the organization, be it private or public. However these indicators must be flexible in case it is necessary according to the changes of the operational environment (MOTTA, 2003).

### **3.2 Data sampling and management**

Performance indicators are one of the most important tools used to understand processes and how they can be improved. They show the company's current scenario in a quantitative fashion. Several data resources from different areas of the company are necessary in order to create performance indicators. According to Pontes (2007), data sampling can be done in three different ways:

- a) Continuous – when data are sampled along the process. Many times they are information restricted to one single event without many variables of influence.
- b) Periodic – sampling demands time for preparation or ending of a cycle, be it for productive or time dependence.
- c) Occasional – are performed by sampling or infrequently from an isolated random operation.

In order to manipulate a great volume of data, database tools can be applied to make visualization and selection of the obtained data easier.

Since in the construction industry projects involve many resources, from human, financial, material and technological in large volumes, however in short periods of time, it is necessary to have an analysis structure, human as well as technological, directed to the project.

Data originated from the different sectors of the company, must be stored separated by areas or departments and by activity or process, because according to Miranda (1999), data are a “known qualitative or quantitative set of registers,

organized, grouped, categorized and standardized properly and which become information".

According to Miranda (1999), information is “data organized in a significant fashion, being used as basis for decision making. For such, in order to transform data into information, human analysis of the results obtained from the evaluation of the set of data is necessary. Such analysis can be either quantitative or qualitative.

According to Alencar (1998), information from the conversion process must be: precise – must not contain errors; complete – contain all the important and necessary facts; economic – must not be costly to the organization; flexible – can be used for several purposes; reliable – must have a methodological basis; relevant – is important for decision making; simple – cannot be either exaggerated or complex; fast – is available when necessary; and verifiable – can be checked.

For data to be object of strategic decision, data mining is a tool that has been used to evaluate it. This methodology aims to create occurrence patterns for data and its inter-relations between the observed values and is normally inserted in specific software for the decision maker.

According to Navega (2002), data mining is located between data (figure 4) and the decision making process. It is a data conversion tool that uses statistical analysis through software evaluation.

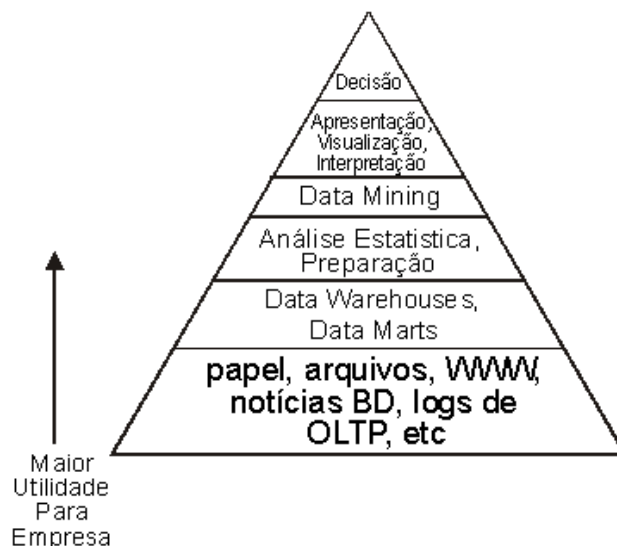


Figure 4 - data mining in the context of decision  
Source: NAVEGA, 2002.



The system aims to search for patterns which are sequences of data regularly presented, by using the induction method, the same used by the human brain to understand the daily facts and happenings. Therefore, data mining is not only a data analysis system, but it is also a fast method for information processing with logic order of data, which transforms sequences in prime information for risk assessment in future scenarios.

Besides planning and evaluating data, data mining creates several rules to understand the set of data. According to Navega (2002), they are as follows: a) Characterizing – characterize the occurrence of data and summarize events; b) Discriminating – separate other data from the characterizing data; c) Associative – look for older rules which connect one concept to another; d) Time evolution – try to identify associations or sequences between data along time.

#### **4. RESULTS AND DISCUSSION**

##### **4.1 CVL analysis in price formation - break-even point**

The relations between information based on data sampling, constitute indicators which not only represent the present enterprise scenario, but which will aid the future strategic planning by limiting the rational use of resources or establishing new goals. For this to happen it is necessary to evaluate not only data, but also variables not pertaining to the company's routine, but which affect the market in which they are inserted. One example are the macroeconomic factors which strongly influence the way investors think and which could generate demand, but because of economic risk, end up reducing investments, which creates a vicious cycle of caution with the retracted economic scenario. Some of these factors can be perceived as discrepancies in indicators, but are approached not with quantitative questions, but with qualitative ones that can work against the company. Therefore, besides data, a holistic evaluation of external information is necessary to fundament and delimit the company's decision making.

The managerial use of indicators represents the evolution level of the reliability of the decision-making, be it of long or short term. Much of the information obtained in the studies are easy to understand and always show the essential relations for good management, like average, relation between magnitudes, percentage variation

and division by projects, which makes it easier for the direction board to make choices.

One example of evaluating parameter is the Balance Point shown in Figure 5, which shows how much the company must produce at a given cost and a specified value necessary to obtain zero net profit. In this same graphic it is possible to evaluate how much profit is possible to make with current output, or even prospect differentiated sales values and reduced manufacturing costs to reach an ideal point of income and profit for the organization as shows the formula below:

$$p \times q = cf + (cv \times q)$$

Where:

p= sale cost;

q= amount produced and sold;

cf= production total fixed cost (variable per plant unit)

cv= variable cost (fixed per plant unit)

At this point we find the total income equal to the total production cost, that is, zero profit, also called Operational Balance Point as shown in figure 5.

Besides PEE there are other two kinds of PE that originate from the first. They are the Cash Balance Point, in which the depreciation costs which fall upon the company's structure are added and the Economic Balance Points which besides depreciation are added to the economic (opportunity cost, externality, inflation) and fixed costs. Both raise the total cost line. When that happens, the company must produce more or reduce costs in order to maintain the expected margin.

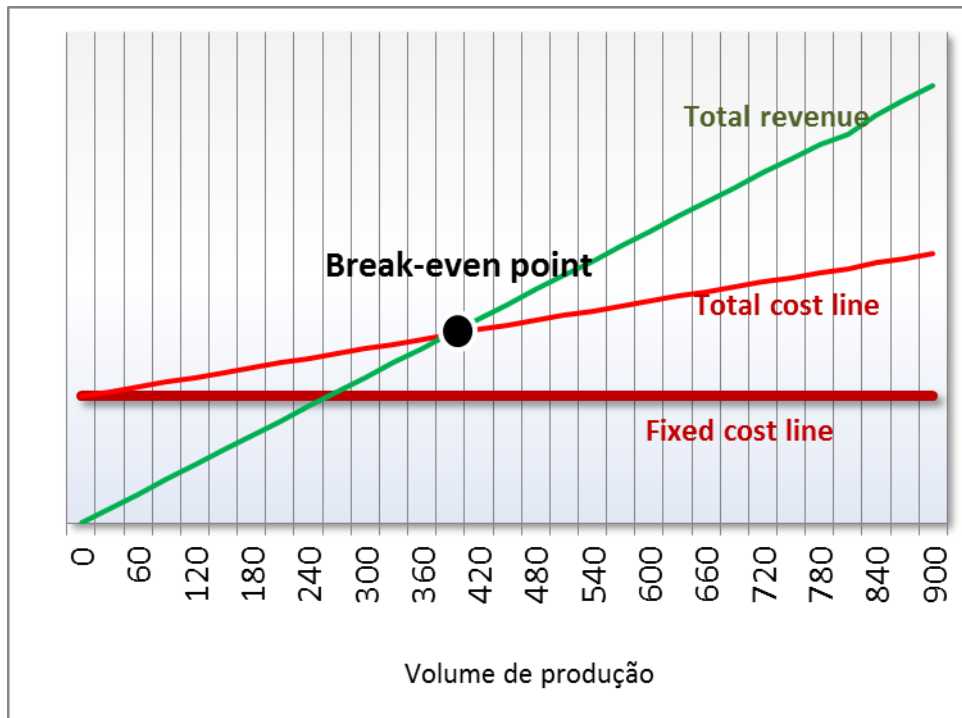


Figure 5 – Breakeven point  
 Source: Author

When the output volume is ascending, fixed costs tend to decline because they are exponentially connected to the volume produced. By following this reasoning it is possible to visualize the importance of maintaining output volumes that use the plant's full productive capacity or services offer.

Another approach to the Balance Point is the creation of a table in which it is possible to observe how the several output volumes influenced the expected profit margin by practicing an "x" sale price which can be re-evaluated and prospected at any time, up to the maximum operational capacity at that moment. This mechanism is based on the triad Cost – Volume – Profit which supports the strategic decision-making process in financial, production and commercial areas. Its evaluation brings a greater quantitative understanding what decisions can bring to organizations.

This relation that is presented, even simple as it is, is partly unknown by some managers, leaves behind knowledge of the real value that can be generated by the available resources.

#### 4.2 Cost evaluation and scenarios prospection

Cost evaluation is essential because according to Ilo (2004) "costs are originated from activities necessary to the materialization of the Project" and to the success of strategic management, because it is through this stage of defrayal that

the project starts to be dimensioned in regard to its Market role of obtaining income, that is, these are the first important characteristics for the commercial bargain power of the product. However, for a proper cost analysis, the process must be preceded by information that captures data to the foundation of the strategy to be adopted. Cost information is no longer only a matter of accountancy and establish a connection with the evolution of the production future scenario. Therefore, these data must be evaluated with a different view from the accountancy aspect. Some accountancy variable costs become fixed costs in a managerial perspective, as is the case of hand labor in the civil construction industry that is directly attached to the productive process and is variable according to production. However, if companies ended their processes today, one of the first objects of liquidation, and in the case of the construction industry, the costliest object would be hand labor. This productive resource represents 51% of productive costs, according to the Brazilian Chamber of Civil Construction Industries CBIC (2012) and thus, its analysis must be properly dimensioned in the decision-making process and strategic planning in what concerns the operation costs.

According to Leite et al. (2004) the hand labor cost evaluation must be constant because there is an optimization in the execution of tasks by the teams. "This is due to the continuous improvement in performing the work and the familiarization of the construction team in the operation environment, that is, it is the learning effect". But this is only possible when there is stability in the operation level of these teams, not allowing idleness, situation that is common in environments of seasonal operations.

According to Kiyan (2001), financial information must be generated with pre-established periodicity, every two weeks or monthly, so that data can be compared. This analysis reveals the behavior of all productive factors, shows its participation and its mobility within the period. With the help of a table that presents the level of variability of indexes, the manager can verify and work with scenarios admitted between the worst and the best stage of utilization of the productive period and the cost dilution. Thus, the decision-making process and future evaluation of the organization becomes less straining and with a much lower level of risk.

## 5. CONCLUSION

The study pointed out that through the use of tools that join information from the productive process and the strategic decision-making, the organization is able to align its objectives and develop the total use of available resources. Instruments which were until recently used merely in accounting, become more and more important for the development of analytical management and concerned with the continuous and stable level of production. It is a fact that there must be an interaction between commercial decisions and production in the sector studied and that the flow of information must be reconsidered. Besides that, the feedback time between the sale process and process of reevaluation of the productive capacity and operational costs must be reduced, thus serving as a competitive advantage in new businesses.

Internal or intrinsic factors must be evaluated and managed strategically and always focused on the company's competitive advantage which can be quality, leadership in cost, from the optimized use of human resources. Once aware of this differential, the sales department can better manage the negotiation by offering clients a cheaper product and of better quality. Such factors can be evaluated with the use of performance indicators, not only financial but also operational, whose role is to show how each process is consolidated in the production chain and what its participation in the cost of the final product. Therefore, it is possible to show the manager which factors can be relocated with the aim of reducing costs in seasonal periods.

In what the external environment is concerned, it must be evaluated how the market behaves, its costs and demand, but never take it as the only reference, because organizations are groups that differentiate among each other by many intrinsic factors which must also be analyzed with priority.

One of the results obtained was to show that the sector has its demand linked to the direct investment flow in a national economy and therefore it is paramount that the manager always analyze the market based on information that present general market tendencies of the sector. Thus, the manager will be able to prospect the organizational growth according to an expected economic scenario. Besides that, this evaluation must serve as a company goal, having everyone to have in a combined fashion the same measured objective.

In this way, by maintaining the production level stable and the operational costs within the prospected parameters, already added with the inter-related variables to the external environment, the company can reduce costs or keep them stable, even in historically times known for suffering a reduction in the production level. Thus, organizations become aware of their actual value flow, being able to transmit them as a commercial policy through the competitive advantage, maximizing their results and increasing their market share.

## REFERENCES

- AGENCIA BRASILEIRA DE DESENVOLVIMENTO INDUSTRIAL. (2009) **Estudo Prospectivo Setorial: Construção Civil**. Brasília. 64 p. Available in: <http://www.abdi.com.br/Estudo/Estudo%20prospectivo%20de%20Constru%C3%A7%C3%A3o%20Civil.pdf>
- ABREU FILHO, J. C. *et al.* (2005) **Finanças Corporativas**. 5º ed. Rio de Janeiro:FGV. 152 p.
- ALENCAR, M. S.(1998) **Telefonia Digital**. 3. ed.São Paulo: Érica.
- ASSUMPÇÃO, J. F. P.(1996) **Gerenciamento de empreendimentos na construção civil- modelo para planejamento estratégico da produção de edifícios**. São Paulo:EPUSP. 37 p. ISSN 0103-9830
- BITTENCOURT, S. F.(2010) **Sistemática para apoiar o dimensionamento econômico da capacidade de produção de empresas com demanda sazonal: o caso de uma empresa fabricante de máquinas agrícolas**. Porto Alegre: PPGEP-UFRGS.
- CIRICO, J. C. N.(2006) **Prospectando mercados: Cenários futuros para as exportações da Empresa JR-Adamver (Mormaii Eyewear)**. Florianópolis: UFSC. 88 p.
- CORRÊA, H. L.; GIANESI, I. G. N.; CAON, M. (1999) **Planejamento, programação e controle da produção - MRP II/ ERP: conceitos, uso e implantação**. 2. ed., rev. E ampl. São Paulo. 411 p. ISBN 85-224-2103-X.
- ESTRELA, G. Q.(1998) Medição e gestão da qualidade através de indicadores de desempenho. **Rev. Elet. Cuero America**. Available in: [http://www.cueroamerica.com/tecnologia\\_calzado/tecnologia\\_calzado\\_08.htm](http://www.cueroamerica.com/tecnologia_calzado/tecnologia_calzado_08.htm) Accessed in: 23 de novembro de 2012.
- FERREIRA, R. G. (2009) **Engenharia econômica e avaliação de projetos de investimentos**: critérios de avaliação financiamentos e benefícios fiscais análise de sensibilidade e risco. São Paulo: Atlas. 273 p. ISBN 9788522456680.
- ILO , J. *et al.*(2004) Planejamento e controle da produção na Construção Civil para gerenciamento de custos, **Encontro Nacional de Engenharia de Produção**. 643-650 p. Available in: [http://www.abepro.org.br/biblioteca/ENEGEP2004\\_Enegep0110\\_0473.pdf](http://www.abepro.org.br/biblioteca/ENEGEP2004_Enegep0110_0473.pdf)

- HELAL, D. H. (2005) Processo de trabalho e produção na construção civil: um estudo de caso. In: **XXV Encontro Nacional de Engenharia de Produção**, Porto Alegre. XXV Encontro Nacional de Engenharia de Produção, 2005.
- KIYAN, F. M.(2001) **Proposta para desenvolvimento de indicadores de desempenho como suporte estratégico**. Dissertação (Mestrado em Engenharia de Produção) - Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos, 2001. Available in: <<http://www.teses.usp.br/teses/disponiveis/18/18140/tde-02082002-075900/>>. Accessed in: 2012-12-11.
- LEITE, M. O.*et al.*(2004) A utilização das curvas de aprendizagem no planejamento da construção civil. In: **XXIV Encontro Nacional de Engenharia de Produção**, 2004, Florianópolis. XXIV Encontro Nacional de Engenharia de Produção.
- MARCIAL, E. C. (1999) **Aplicação de metodologia de cenários no Banco do Brasil no contexto da inteligência competitiva**. Trabalho para obtenção do Diplôme d'Études Approfondies. Université de droite et des sciences d'aix : Marseille.
- MIRANDA, R. C. R.(1999) **Informações estratégicas: estudo de caso aplicado à ECT**. Dissertação de mestrado. Brasília: UnB.
- MORITZ, G. O. *et al.* (2009) **Aplicabilidade da prospecção de cenários como ferramenta de auxílio na tomada de decisão em gerenciamento de eventos**. V Congresso Nacional de Excelência em Gestão. 14 p. ISSN 1984-9354
- MORITZ, G. O. (2001) **Análise de cenários para tomada de decisão**. Apostila Mimo. Florianópolis: UFSC.
- MOTTA, P. R.(2003) **Gestão Contemporânea: A Ciência e a Arte de ser Dirigente**. Rio de Janeiro: Record. 256 p. ISBN: 8501037869
- MUÑOZ, R.; QUINTELLA, R. H.(2000) **A inovação tecnológica e o sistema de franquia na construção civil de Salvador**. In - EnANPAD, 24<sup>o</sup>., Florianópolis. Anais.
- NAKAGAWA, M. (1991) **Gestão estratégica de custos: conceitos, sistemas e implementação - JIT/TQC**. São Paulo: Atlas. 111 p. ISBN 85-224-0731-2
- NAVEGA, S.(2002) **Princípios essenciais do data mining**. Infoimagem. São Paulo: Inteliwis. Available in: <http://www.inteliwise.com/reports/i2002.pdf> Accessed in: 2012-07-05.
- PBQP.(1991) **Programa Brasileiro de Qualidade e Produtividade**. BSI. Available in: [http://www.bsibrasil.com.br/certificacao/sistemas\\_gestao/normas/pbqph/](http://www.bsibrasil.com.br/certificacao/sistemas_gestao/normas/pbqph/).
- PONTES, B. R.(2007) **Avaliação de desempenho: nova abordagem**. 8. ed. São Paulo:LTr.
- PORTER, M. E. (2004) **Estratégia Competitiva: técnicas para análise de indústrias e da concorrência**. 2<sup>a</sup> ed. 12<sup>a</sup> imp. Rio de Janeiro: Elsevier.ISBN 85-352-1526-3
- SECURATO, J. R.(1993) **Decisões financeiras em condições de risco**. São Paulo: Atlas.
- SILVA, C. L.(1999) **Gestão estratégica de custos: o custo meta na cadeia de valor**. Revista FAE.Curitiba, v.2, n.2. Available in: [http://www.fae.edu/publicacoes/pdf/revista\\_da\\_fae/fae\\_v2\\_n2/gestao\\_estrategica\\_de.pdf](http://www.fae.edu/publicacoes/pdf/revista_da_fae/fae_v2_n2/gestao_estrategica_de.pdf) Accessed in: 2012-11-23.



VALENTIM, M. L. P.(2002) Inteligência Competitiva em Organizações: dado, informação e conhecimento .**Revista de Ciência da Informação**.v.3 .

VANKATRAMAN, N.(1994) **IT-Enabled Business Transformation: From Automation to Business Scope Redefinition**. Sloan Management Review. Winter.