

HOW TO APPROACH MANUFACTURING STRATEGIES

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ABSTRACT

Into the Manufacturing Sector of local industry, both domestic and foreign capital, operate high level technologies, and is very usual to observe that a lot of different kind of technologies are implemented by relatively ineffective processes. This cause that all of those technologies, which were adapted, are not operated with all the effectiveness we can expect, that means a planning issue. Because of that, this article has as main purpose to analyze the descriptive models for the formulation of manufacturing strategies, which exist in the state of the art, and into the manufacturing industrial sector, in order to design a special model for planning, formulation, display and evaluation of Manufacturing Strategies (MS).

Problem statement and specific questionnaires are performed; and objectives are presented. Later, an analysis of theory contents and descriptive models are described in order to determine the characteristics that a model with more capacity of explanation must have it.

In addition to this, in this article are mentioned some recommendations, questions and key basis for future researches, regarding development and deployment of Manufacturing Strategies, with a systemic and strategic focus.

Key words: Manufacturing Strategies, Manufacturing Management, Models.

Cite this Article: Francisco Bribiescas Silva, Jose Nicolas Cardona Mora, Roberto Romero, Rosa Corona, How to Approach Manufacturing Strategies. *International Journal of Management*, 7(6), 2016, pp. 123–139.

<http://www.iaeme.com/IJM/issues.asp?JType=IJM&VType=7&IType=6>

1. INTRODUCTION

Since 1970, competence into the productive sectors was developed rapidly and with an unpredictable future; to confront it, some new kind of operational strategies were stated at the manufacturing field, and those strategies were more flexible and efficient (Prahalad & Hamel, 1990). Just to mention some of the innovations that were generated, we have the Strategic Management Systems, Quality Control Models, New Manufacturing Strategies and more flexible organizational models.

At the present time, there is a extended literature which applies and analyze all the different proposals about conceptual and theory models which were studied and validated by many expert authors in Manufacturing Strategies (MS). Those models are applied in manufacturing companies, where is very evident that exist a lot of problems in taking decisions regarding manufacturing. Statistics and empiric data

all indicate that those problems do exist, and wrong and ineffective solutions are implemented in the manufacturing area.

In the literature many analysis cases are presented and into the local industry, a lot of empiric evidence is observed by many different problems such as:

- Change Resistance; methodologies and right techniques, are not accepted by the employees. This causes a not effective execution.
- Learning Resistance; comes from the not effective execution.
- Missing of planning strategies.
- High-level education does not match with the present competitive situation.
- There is a labor culture, which is no focused to the improvement.
- Missing of a Production System Model.
- Too much vertical Organizational Structure.
- Taking decision in invest technology in many operational and productive sectors.
- Quality based in contentions, which come from machinery problems, non trained personnel, and lack of maintenance to the operation tools.

For the mentioned issues, an analysis of manufacturing strategies and methodologies are requested, that is in order to formulate a specific model for planning, structures, elements and some different kind of relations between those concepts. All of these must be under an effectiveness perspective.

2. PROBLEM APPROACH

In the literature on the Manufacturing Strategies -MS- of the last 10 years common and complexes problems are exposed such as, a labor culture with low level of focus toward the improvement, the strategies of managerial administration, the lack of production models, no investment in high data Technologies, etc., in which the absence of administrative models is observed.

For the formulation and deployment of the MS, (Caporello, 1996) indicates that one problem that is showed in the MS is the lack of consensus between authors and experts on its theoretical contents, this complicates the selection of the methodologies to formulate strategies, and this is corroborated in the following notes:

For Cheng (1996), the MS has nine study categories that they are: installations, capacities, vertical integration, process technologies, product technologies, human resources, quality administration, manufacturing infrastructure, and suppliers relation, while for Cil (1998) are the administrative principles the ones that determine as they to be produced, the resources that to be used and deployed; the organization of the support infrastructure for manufacturing, where an expert system is proposed for the MS with links to the marketing and with some manufacturing attributes. Amoako (1998), studied the forecast methodologies, planning and production programming, job practices in the production floor, practices to the materials administration, fabrication strategies, investment in modern technologies and acquiring competitive advantage.

To confront these problems, today the manufacturing organizations they are investing in the administration and improvement of the MS planning to take the best decisions in investment and continuity in the competitive markets & profit value of the business, in addition as creation of alliances, and the seeking of innovation for the competitiveness in the fast and aggressive manufacturing processes. Nevertheless there is not a general and effective industrial practice to design strategies. The importance of the theory – practice in the businesses is observed in its costs, competitively, and using of technology to solve this kind of problems.

2.1. Why this approach?

The creation focused on the Value Added Process Flow in an organization with MS, in which the processes should be sensitive to customers with flexibility and agility. The customer is tied to this value flow chain by the same value creation, same as the supplier's integration.

According to the diversity of works developed by MS, exists a lack in the agreement among the experts, and some elements are not well determined and it is used different terms; for which must determine the methods more appropriate, and realize a search of variables and add those contents in a function that indicate the value or utility of the plan. In that way to deploy correctly the MS is a complex problem from several studies and analysis to find financial and economical solutions.

Currently, global businesses and manufacturing processes are in an intensive competition, obliging them to develop a superior and effective capacity to avoid their exit of the market. By the scientific and financial importance of the topic, is necessary an adequate model with more explanation power that helps to make correct decisions in formulation and deployment of the MS

3. GENERAL OBJECTIVE

Design a more effective model instead of the regular practice of formulating Manufacturing Strategies.

3.1. Specific Objectives

- Determine in local manufacturing enterprises the Planning factors with more impact in the operative results
- Determine the theoretical contents in the Manufacturing Strategies
- Determine the structure of the Manufacturing Strategy
- Determine the adequate organizational structure for the management of MS
- Determine the contribution of this administrative model in the creation of a competitive advantage

4. LITERATURE REVIEW

In the literature about the practices to formulate, design and prepare MS, most of the main contents from different authors in the reach of one methodology to develop those practices are occurring when an absence of a corporative strategy planning process was identified (Skinner 1969), and the idea of one MS formulation tied to the Corporate Strategy it's gaining ground. Too many articles about theory and practice were published the last 25 years, but still are under debate and development.

As result, the companies should adapt their manufacturing strategies into the corporative context; product, capital, labor market, regulatory systems and other mechanisms. The emerging markets are weak in almost all these areas. In the case of the product markets, customers and suppliers usually suffer of a severe crisis of information because three main reasons: First, the communications infrastructure in the emerging markets is frequently underdeveloped. Second, if the products information is in various places, non-mechanisms exist to confirm the declarations made by the buyers. Third, customers do not have feedback mechanisms if a product is not delivered as promised.

Some development assessment tools were done in an uncertainty environment by Swamidaass (1991), and Maruchek (1990) they made an empiric study of alternative processes for the MS, also Hill (1994) developed a conceptual model for the MS process consequences applied in many cases of study. Cheng y Musaphir (1996) developed a methodology as result of discussions with companies that handle a strategic role in manufacturing.

In relation to the content of the formulation and deploy of the MS process, in various published jobs, Tracey & Vonderembse, (1999), Quezada & Cordova (1999), Li & Hamblin (2003), McKay (2003), Devaraj (2004), shown studies that include variables as: organizational schemes and metrics to measure operations competitiveness and performance results. The effectiveness of the development in the MS is increasing importance, even where still exists contrasts and lack of consensus between authors.

5. THE ORGANIZATIONAL STRUCTURE

During the development and display of the MS, the organizational structure is an important factor; it could be considered controversial if a specialist scheme is adopted in financial/economic items or of a multidisciplinary group. This functional structure has permitted the participation of manufacturing, research and trade manufacturing personnel, to take group decisions and adaptation of methodologies, as it is reported by Tung (1998). Also, Kakati (1997) mentions that the external vision of the critical factors of the success is what it is given as an advantage, and this is motivation reason for the people to learn by the social process of the multidisciplinary groups.

Wierzbicki (1997) recommends that multidisciplinary teams in relation of the multicriterial decisions that are taken must consider MS; Naude (1997) says that the analytic models are less used when the level of responsibility and the professional experience increases in the decisions taker. The decision taking of the high management has strategic means in the long term, and depends on the analysis of multiattributes that oblige to be a group with tools that all the group will understands and will not represent a conflict.

Besides, Richardson (1996) mentions 18 environment factors: technological innovation, economy activity, local authorities, social attitudes, local community, government politics, commercial unions, clients, culture, international relations, enterprise associations, pressure groups, competitors, weather, financial groups, stockholders and suppliers.

For Frohner (1996), this consultation is what let's focus the attention of the complete problem; the emphasis of this must be given in the systematic models for an effective plan. From a systems view, the MS is a predictor that casually influence in the organizational factors and the environment, where for Hamblin (1996), organization factors influence in the financial results; and for Berman (1983), the environment study is necessary to respond to the technological changes, that is the reason that the first step is a research of the environment of the industry.

6. RELATIONS OF THEORETICAL CONTENTS OF MANUFACTURING STRATEGIES

Skinner was the first one in articulate and proposes the concept of MS, used to avoid the isolation of this area from the rest of the functional and strategic of the rivalry of the firms. Leong (1990), showed that the most important elements of the MS can be captured in two areas:

- Competitive priorities or capacities
- Decision strategic categories

Hayes & Wheelwright (1984), distinguished between the manufacturing decision categories from a natural structure and infrastructure, where the structural decisions cause an impact in the long term, are difficult to change, require a substantial investment of capital and include decisions related to capacity, convenience, technology and vertical integration. The infrastructural decisions are more tactical because they enclosed uncountable decisions and do not require high-income investments, these include: means of work, quality, planning of production/control of materials, organization, process development and timing of new products, and compensatory systems.

The MS is characterized as a consistent patron of many individual decisions that affect the ability of the firm to accomplish the long term objectives, in this sense the affectivity of the MS could be measured by the fixed or consistency between the competitive priorities, (which are emphasized), besides the corresponding decisions of the structure and the operations infrastructure.

Voss (1995) defends the existence of three paradigms of the selection and contents in EM: a) competing through the capacities, b) the strategic selection in the MS –and– c) Better manufacturing practices which interlines a superior development and capacity. Checking the literature, it shows the existence of different approaches or theoretical points of view, besides poor empirical investigation in the

field. The studies review applied in manufacturing firms shows a great confusion in relation to the terminology in the field.

It must be consider the influence in the alignment between MS and the strategy of the business and the contribution of the role of manufacturing to the role of the business, the strategy is the connection between the external marketing requirements, the inside organization and the technological resources, the capacity and the competitive advantage; without an appropriate strategy, the resources and technological capacities of the organization will be mislead.

In accordance to Sun (2002), the strategic functions that can be included in the MS are the marketing strategy and the strategy of research and design. The MS is a link between the business strategic, the organization and the inside technological base. As serving as a link, the MS is lined up with the business strategy, this alignment or internal-external consistence is looked as one of the examples in the MS (Voss, 1995), spite that no sufficient attention was given to this alignment. A firm must try to respond to the external atmosphere with efficiency to win competitive advantages (Porter, 1990).

The strategies are used to know the capacity of a corporation as a competitive weapon and to reach its mission and objectives, and traditionally the manufacturing activities were not know to contribute to the competitiveness, because they were considered as operational and were not based on maximum efficiency (Avella, 1999). Through a review of the literature it can be seen that the alignment between the Business Strategy and the MS could be analyzed in two perspectives: the MS can support the strategy of the business, and that the business strategy can be based in the manufacturing capacity.

Statistics reflect that firms that do not transform their strategies almost never and company goals into an MS have a -4% percent of profit while the firms that formally transform their business strategies into an EM have a percent of profit of 15%. There are some implications where it is necessary a change in attitude in reference to the manufacture so an alignment can be reached, so, for the inside alignment to be done, the manufacture objectives, the processes, the technology, the organization and the human resources must be considered. Beside this the marketing, manufacture, research, and design must be included; it is necessary to develop tools or methods to establish a perspective of multiple functioning to create a strategy.

Cheng and Musaphir (1996), show some factors and steps that must be considered, they show very clear the missing link with the strategy of the corporation, besides this, they consider some turning points to show the strategic view in the implementation, like the company culture, performance metrics, decisions making and management styles. They shows three studies of organizations related to the formula and implementation of MS; in the formulation, an activity was found connected in the identification of the risks and opportunities, also the determination of the material resources, technical, financial and administrative.

The decisions on infrastructure due its nature, are considered more as tactics, they include uncountable decisions, they are linked to the specific aspects of the business and generally do not require high investments of capital, such as: a) workforce, b) quality, c) planning of production/control of materials, d) organization, e) development of new products process, f) measure of performance and systems of rewards.

The process of creating a strategy has been formally studied since 1960, where Hofer & Schendler describe a number of steps that in a way present a form of process of strategies. Quezada & Cordova (1999) show a process to form a MS developed in a medium company in accordance to Figure 1.

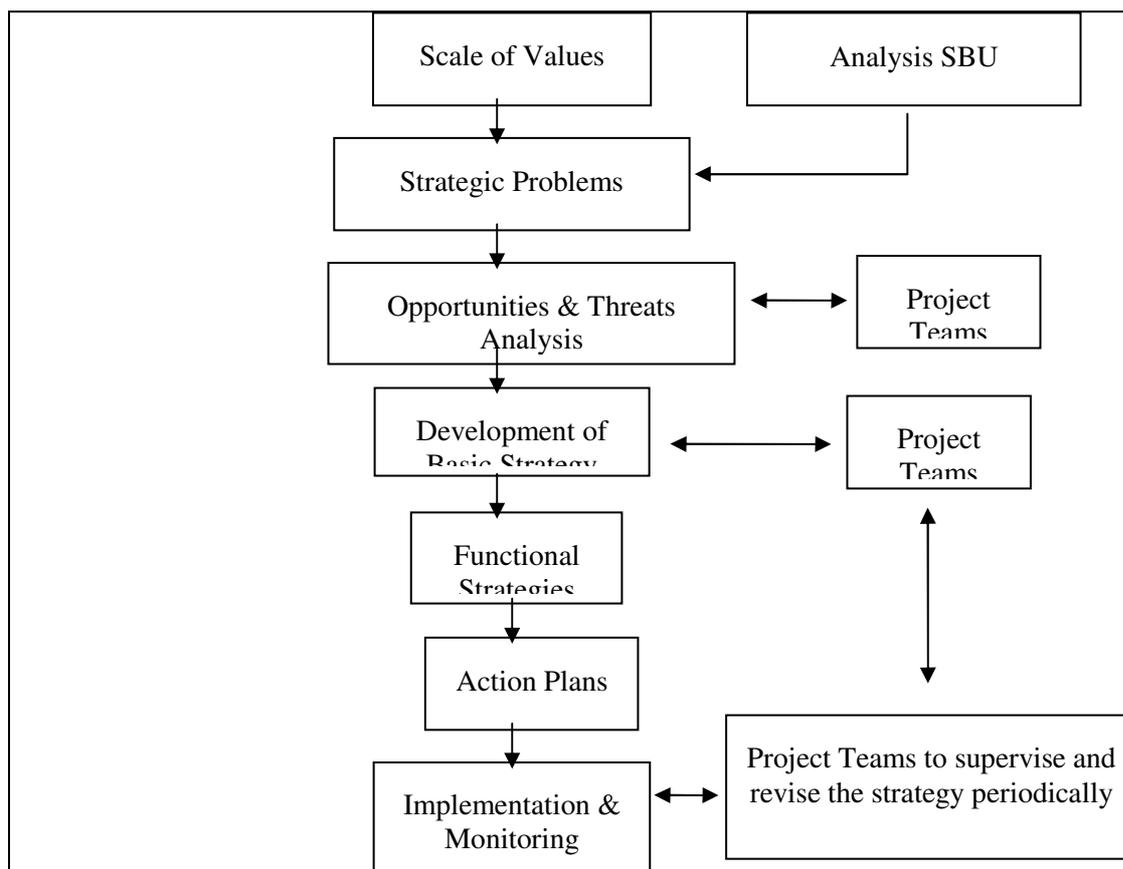
Voss (1995), defends the existence of three different examples for the selection and contents of MS: a) the first one competing through the capacities, where the organization must line up with the principal factors of success, its incorporation of strategies of marketing and of the demands of marketing, b) the strategic decisions in the MS, based in the internal and external needs, and c) the best practices, characterized, by example, with world class manufacture that heads to a superior capacity performance.

Studies on some models and work frames to examine the theories of MS in the practice (Demeter, 2003), asks the question: is there a connection between MS to be on a level and the business level? What lead us to determine the variables or factors that are important for its formula and review the performance

of the business in terms of the effects-results in the production; such as the quality and contest cost in accordance to Phillips (1983).

Meyer and Ferdows (1990) analyze that the implementation of some production programs is not sufficient, therefore it is necessary to look for a strategic portfolio to have a good performance; Beaumont and Schroeder (1997) also have determined the connection between technology and performance as determinant factor. The effects of a strategic production are operated in one or two variables in accordance to Roth and Miller (1992) whom emphasizes the role of the production managers in taking decisions for the performance of the business as the center of attention.

Figure 1 Business strategy formulation process



Source: Quezada & Cordova (1999)

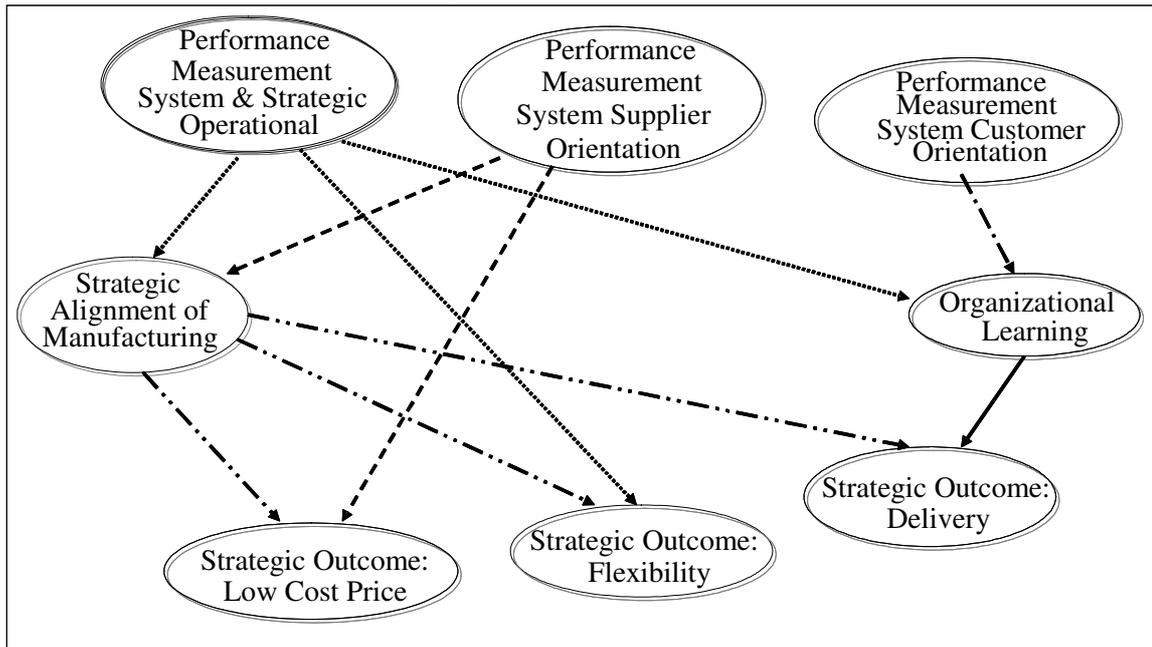
7. PERFORMANCE OF THE DIFFERENT ELEMENTS/VARIABLES

The process for the formulation and implementation of MS is complex and is not very well understand, the tests of them are important to show the feasibility that can be used and its uses, in accordance to Platts (1998).

To establish a view to understand better the role of the strategic measurements of a performance system that can help the organizations to have their competitive strategies higher, align them with the organization development of learning, in accordance to Chenhall (2004).

At the same time, he says that the strategic operations passed through the elements of the value chain, with a view of the client and the financial status, besides the link of suppliers based in innovation measurements of the business, identifying the cause-effect between operations and the organization strategic. It is shown in Figure 2, the integrate model proposed by Chenhall.

Figure 2 Model of Chenhall

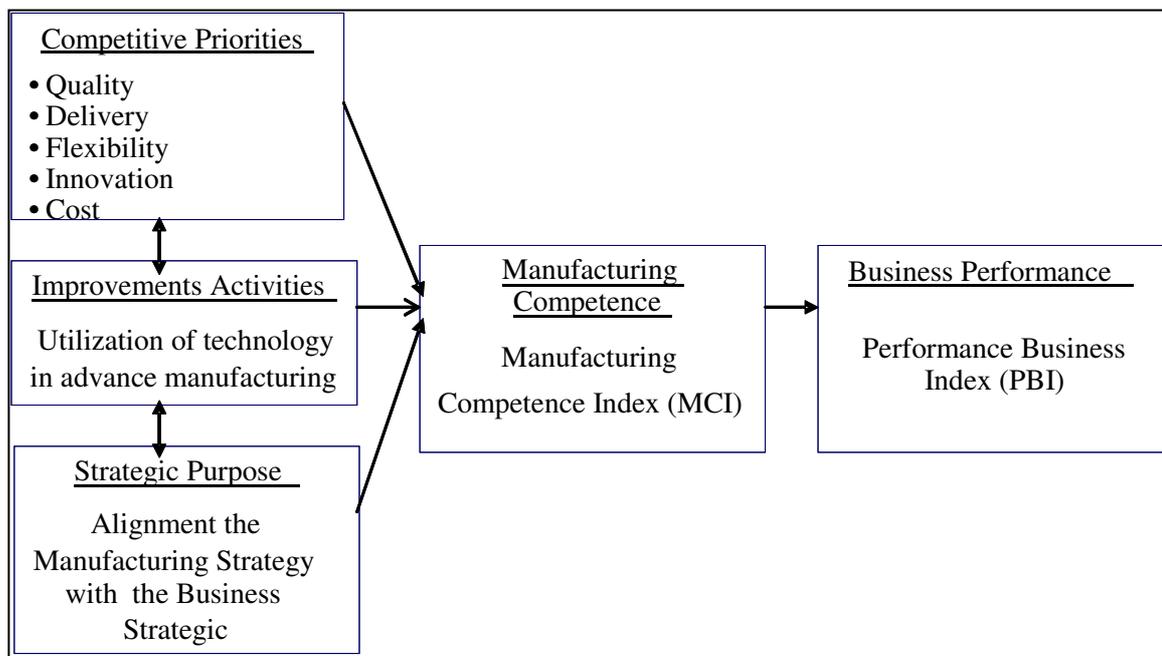


Source: Chenhall (2004).

Dangayach and Deshmukh (2004) show a model for MS, based in the link that is between the competition of manufacture and the performance of the business, besides the previous interrelation of the competitive priorities, improvement activities and strategic purposes.

As it can be seen in Figure 2.3, the link between the manufacture competence and the business performance; these practices are tightly related with the specific priority of Cost, Conformity Quality Compliance, Flexibility in volume and in the design, and fast delivery and product cycle times.

Figure 3 Model of Dangayach-Deshmukh



Source: Dangayach and Deshmukh (2004)

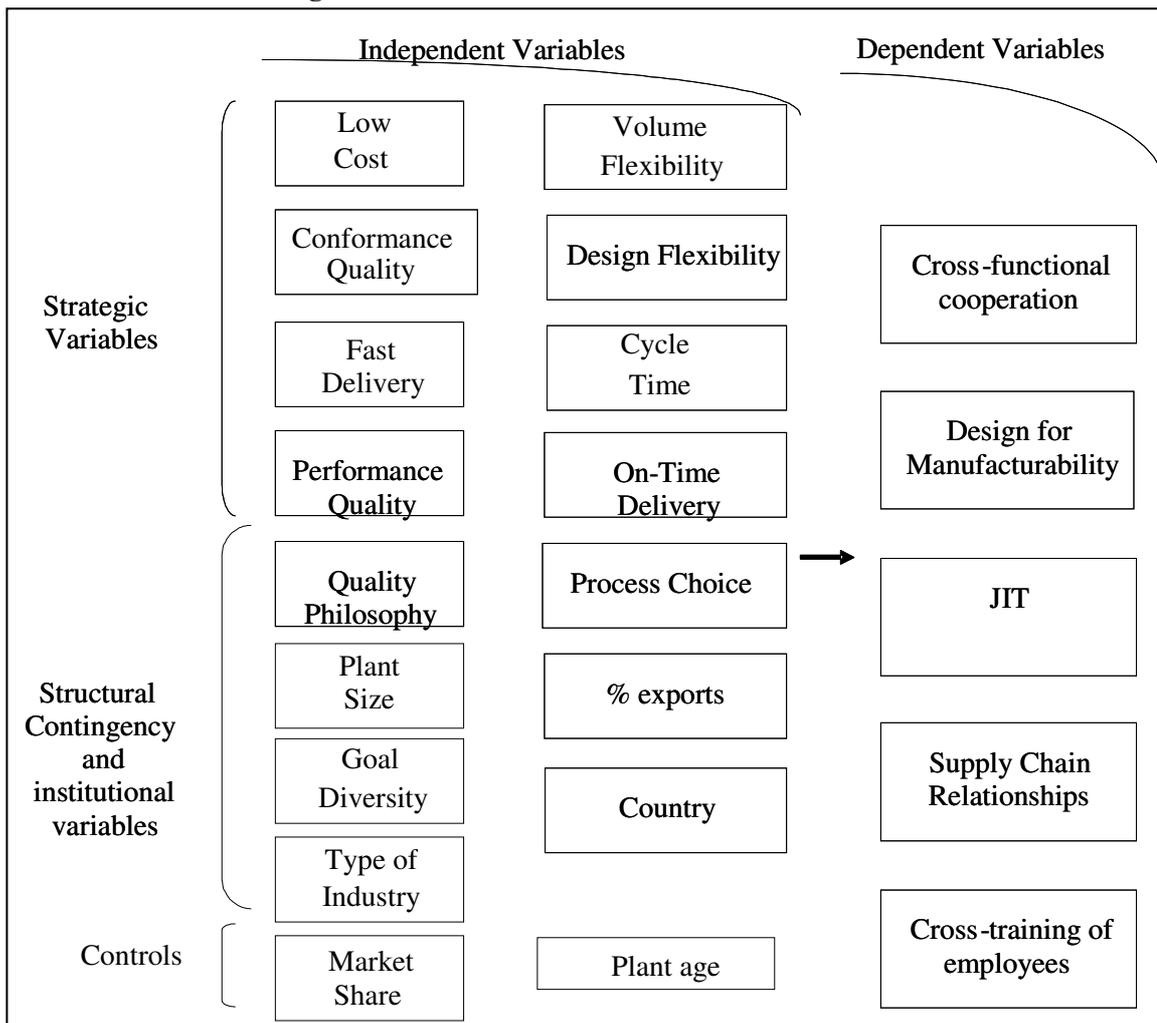
High diversity is identified as an operation goal inside the organizations, where it is an uncertain task and must be a main possibility in the structure. It establishes a relation of independent and dependant variables, where the dependants are seen as constantly predictors, as it is shown in Figure 4. It is obvious that the variable operates the structure with high value and where the risks of emergency are weak to explain the variable.

The central question in the administrative investigation is: Why in some organization the performance is better than in others? It has been found that certain practices and structural arrangements are related with the operation and financial performance, but even there is very little systematic evidence exists. The limited existence is the need of direct measures.

O'Reagan (2005) explores the process of the innovation within the context of the strategy, culture and management styles in effective innovation. In the rapid path within the MS, its analysis confirms that organizations of execution make a higher emphasis in quality of the strategy and have stronger and more defined direction, and cultivate the styles compared with the execution firms of lower point. Now it is appropriate to consider the impact of the main conductors of efficiency innovation, and these are: strategy, direction and culture.

Investigation on the innovation has been centered in the cost and the implied risks, where the factors that conduct to the unveiled of the innovation have three important influences: the strategic plan of the firm, its capacity to conduct the process and its capacity of conciliate the process of innovation. The human resources address the culture of empowerment and the characteristics of the creativity of the staff are associated with the innovation.

Figure 4 Ketoviti-Schroeder Multivariate Model



Source: Ketokivi M, R. Schroeder (2004).

Hipkin (2004) mentions the aspect of the technology as a new strategy in the global context and very specific in developing countries, having a correlative methodology of importance and control, where the technological barriers are considered between products of high and low value. It mentions influential factors in the technology as: economic and political subjects, the administration of human resources, technical subjects, operation subjects, administrative and financial knowledge, short and long term strategies, strategic alliances and culture.

Devaraj (2004) in his studies confirms an important presumption, but still not proven that this is the base of the topologies of the MS, in the literature- the connection between the previewed strategy (objectives) and the observed strategy (manufacturing structure) with its effect over the manufacturing results, it was very surprising that the results for the objectives and the orientation-costs strategies were not as strong as the ones for the orientation-difference.

On the other hand, the management's capacity on the long term is vital to any manufacturer firm, it has implications in the competitive development in terms of costs, delivery speed, reliability and flexibility; Olhager & Rudberg (2001) make observations that in a MS, the capacity is an structural decision, negotiating with the expansion of dynamic capacity and relative reduction in the changes of long term of demand levels. Sales and Operation Planning is planned on long terms of production levels in relation to sales.

In the MS the capacity is considered as one of the category decisions with more weight. The capacity in the long term will determine the sales plan based in the prediction of demands which it become a new capacity. Any difference between the sales plan and the production plan will result in an inventory, the sales and the planning of the operations its the scenery where different strategies are joined to establish a production plan that will solve the market needs, besides it gives the support to the financial strategic plans of the company, such as: employment levels, inventories, subcontracts and production outcomes.

The flexibility in MS is explained by Gupta & Goyal (1992) as the capacity of a manufacturing system to encounter the circumstances and the instability that change because of the environment; Benjafaar (1994) observes that the flexibility is the mechanism that takes care of the breaking potential of the variable in a dynamic environment. The flexibility is much related to the just in time manufacturing and/ or lean manufacturing.

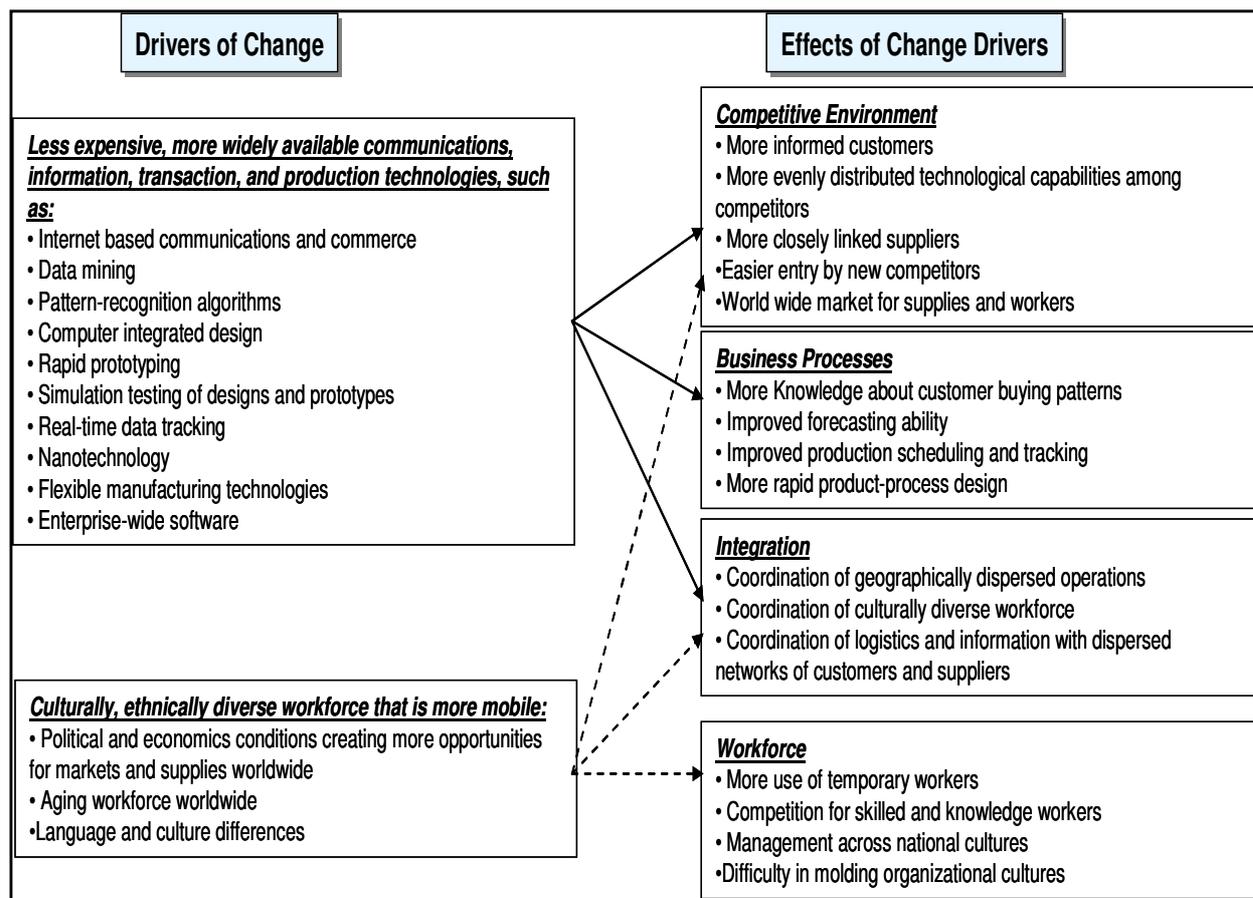
8. BEHAVIOR FACTORS WITH IMPORTANT RESULTS

There are many sources of literature that can identify technological tendencies and work global forces that will affect the formulation and implementation of the MS during this decade and the following, which is the reason that special indicators are planned for future investigations in MS (St. John, 2001).

It is shown in figure 5, a description of the special indicators and its effects, which must be considered for the development of the MS. The empirical evidence has demonstrated that the structure and work culture has influence in the organizational behavior that is why the plain structures will be proper for the communication, participation and collaboration in favor of the formulation, unfolding and evaluation of the MS.

In addition to this, the priority of the professional ethics, the values, the planning of activities, direct communication, total involvement of the employees in the projects, and team work, as well as the participating leadership, visionary and innovator, without any doubt they will contribute to the development and the increasing of the productivity of the company with MS more consistent and mature in their operating procedures.

Figure 5 Drivers of Change and their Effects



Source: St. John Caron, Alan R. Cannon, Richard W. Poudet. (2001).

9. PLANNING SYSTEMS COMPARISONS

In this section are the comparison results of the Planning Systems of the companies that are working with and without Strategies. Table 1 shows the differences between the two segments by the scores Very Good (VG) and Good (G), where practically the companies without planning technologies have 50% of the scores from the other segment. Other scores mean the following: Very Bad (VB), Bad (B). Also it is clearly shown that the major disperse of scores are of the companies that have development level, coming from of lack of specific planning model by this the analysis an taken decision about the technology is wrong.

Also this study show the major differences between the components or elements that are related with the business planning and not with the operative tactic decisions; it can be seen in section 3 and 4 of the Table 1. It's possible that could be easier to imitate the continuous industrial practice than to create and develop competences for the business planning.

In Table 2, the statistics differences between two organizations segments are showed with bold letters. Relating the theoretical contents of the planning view, the main differences are in points 1.1, 1.2 and 1.4.

Table 1 Planning Systems comparisons

Planning Systems Elements	Companies Segments									
	WITHOUT STRATEGIES					WITH STRATEGIES				
Element / Component	1	2	3	4	5	6	7	8	9	10
1. Planning Technologies										
1.1. Generic Strategy	B	B	G	B	B	G	VG	G	VG	G
1.2. Theoretical Contents	VB	VB	B	B	B	B	G	G	G	G
1.3. Deployment practices	G	B	G	G	VG	G	VG	G	VG	VG
1.4. Forecasting Technologies Methods	VB	VB	VB	VB	VB	VB	G	B	B	B
1.5. Personnel expertise	B	VB	B	G	G	G	VG	G	VG	VG
1.6. Kaizen Projects	G	G	G	VG	VG	G	G	G	VG	G
1.7. Innovation & Development	B	B	VB	G	B	G	G	G	VG	G
1.8. Technology Acquisition	G	G	G	VG	G	VG	VG	G	VG	G
2. Product Technologies										
2.1. Design Methodologies	NA	NA	NA	NA	NA	NA	G	NA	B	NA
2.2. Competitiveness Studies	VB	B	B	B	B	B	G	B	B	B
3. Process Technologies										
3.1. Design Methodologies	G	VG	VB	B	B	G	VG	G	VG	B
3.2. Capability & Competences	G	VG	B	B	G	G	G	G	VG	G
3.3. Supply Chain Management	B	B	VB	VB	G	G	G	B	B	B
3.4. Facilities	G	G	G	G	G	G	VG	G	G	VG
4. Information Systems & Management Technologies										
4.1. Quality Systems	VG	G	B	G	G	VG	G	VG	G	VG
4.2. Production Management	B	VG	G	VG	VG	G	VG	VG	G	VG
4.3. Work Force Practices	G	B	VB	G	G	G	G	G	G	G
4.4. Manufacturing Management	VG	VG	G	VG	G	VG	G	VG	G	VG
5. Planning Capabilities	B	B	B	G	B	G	VG	G	VG	G
Totals	13 VG	33 GB	30 B	14VB	29 VG	51 G	11 B	1 VB		

Source: Based in Own production

Other difference is presented in the personnel that will be planning to recruit the people and the talent as well, as we can see in the point 1.7, and also the supplier chain integration in the point 3.3.

Related with the planning model and based in all facts observed, the differences are in the Strategy selection, together with the facts analyzed, getting advantages over companies or organizations that are not using those methodologies.

These differences are indicating that the Strategy is going to give more attention to recruit and selection of the personnel. Also the newness for developing projects to improve production's team performance, as it's shown in the point 1.7

These MS processes are of lowest intensity related with internal researching or developing projects, specifically on the technology transfers, like equipment, process, production and human technology. In the point 1.8, the MS processes were studied like mentioned before, there are more concentrated to acquire new technology equipment through simple replacement, where are analyzed by discount flow methodology and his scope is going down to evaluate some alternatives, develop measurements to get assimilation and to be of long continuance.

The link of the equipment problem with the Strategy, explains the low contribution (6.25) and that the systems to study the problem could not be different. Is clear the difference between customer integration degree and suppliers, as shows point 3.3.

10. ACTUAL STRATEGY ANALYSIS

Related with the objectives, the empirical evidence obtained is enough to accept that exist a predictor strategy between performance results and the Strategy, adding that with the plastic companies research, were determined the elements of the strategies that are building all process phases for the MS, its influence in the results and the literature revision of the state of the art

11. STRUCTURAL DESCRIPTION AND DEPLOYMENT OF THE MODEL PROPOSED

In reference to its application, it is used to objective know the planning of MS, although this model with its structure will take us to obtain results and real decisions in the manufacturing environment. The process for its analysis and the taking of decisions for its formula and deployment is shown in Figure 6.

As it can be observed, The Generic Strategy is an important contributor element in which we study the actual situation, the future that we wish and in where the goals, values, mission and vision are included, the study that is done is in the Company Philosophy (point 1).

The taking of decisions (point 6) to establish a correct formulation and unfolding of MS comes from the formation of a multidisciplinary group of directors (point 5) that are experts in finances, manufacturing, administration, engineering and logistics.

Table 2 Differences between company's models by segments

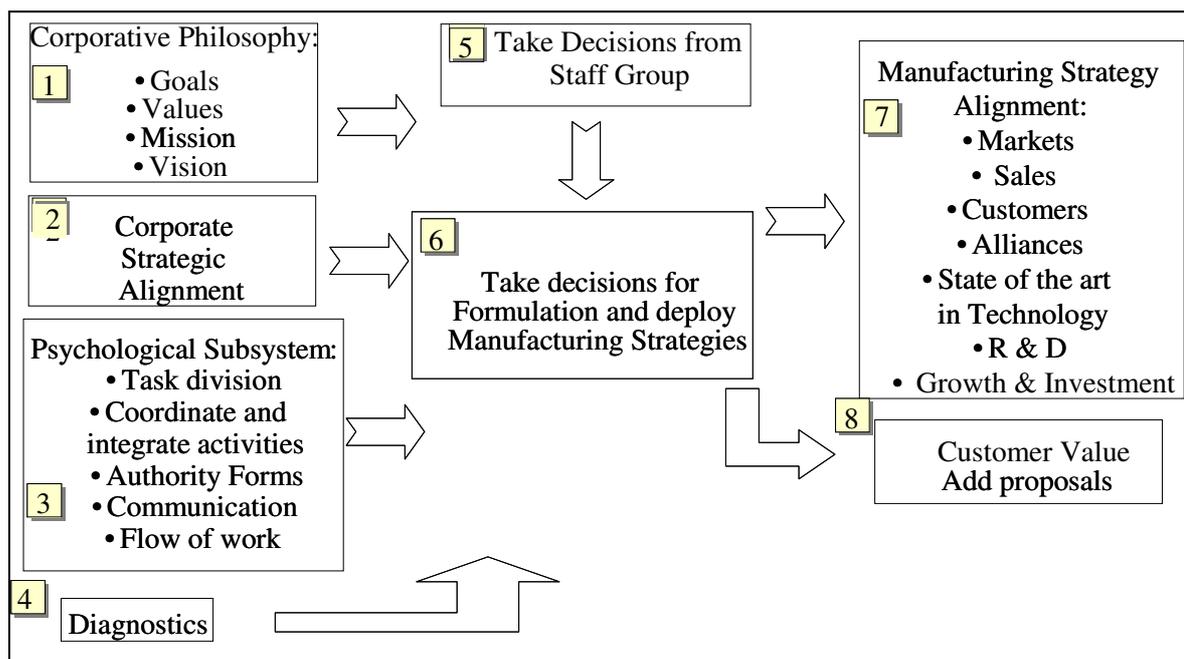
Planning Systems Elements	Companies Segments								PERCENTAGE OF CONTRIBUTION
	WITHOUT STRATEGIES				WITH STRATEGIES				
Element / Component	VB	B	G	VG	VB	B	G	VG	
1. Planning Technologies									
1.1. Generic Strategy		4	1				3	2	39.06
1.2. Theoretical Contents	2	3				1	4		39.06
1.3. Deployment practices		1	3	1			2	3	3.12
1.4. Forecasting Technologies Methods	5				1	2	2		39.06
1.5. Personnel expertise	1	2	2				2	3	23.81
1.6. Kaizen Projects			3	2			4	1	4.76
1.7. Innovation & Development	1	3	1				4	1	20.83
1.8. Technology Acquisition			4	1			2	3	6.25
2. Product Technologies									
2.1. Design Methodologies						1	1		-----
2.2. Competitiveness Studies	1	4				3	2		7.81
3. Process Technologies									
3.1. Design Methodologies	1	2	1	1		1	2	2	10.85
3.2. Capability & Competences		2	2	1			4	1	1.56
3.3. Supply Chain Management	2	2	1			3	2		31.25
3.4. Facilities			5				3	2	15.63
4. Information Systems & Management Technologies									
4.1. Quality Systems		1	3	1			2	3	3.12
4.2. Production Management		1	1	3			2	3	5.56
4.3. Work Force Practices	1	1	3				5		7.81
4.4. Manufacturing Management			2	3			2	3	----
5. Planning Capabilities		4	1				3	2	39.06

Source: Based in Own production

This group is aligned to the company strategies (point 2) where the topics are selected to review and generate the paths of the strategic factors, these are the base of the construction of the model and it is integrated into the Company Philosophy for the Future (point 1).

The importance of the psychosocial, where the tasks are coordinated and the activities integration, as well as the correct communication channels (point). Afterwards a diagnosis is made and given (point 4) to obtain information, which is analyzed and the results are interpreted, which takes us to a manufacturing strategies alignment (points 7-8) directed to the market and clients, developing proposals of creation of values.

Figure 6 Administrative map structures to take decisions in formulation and deployment Manufacturing Strategies



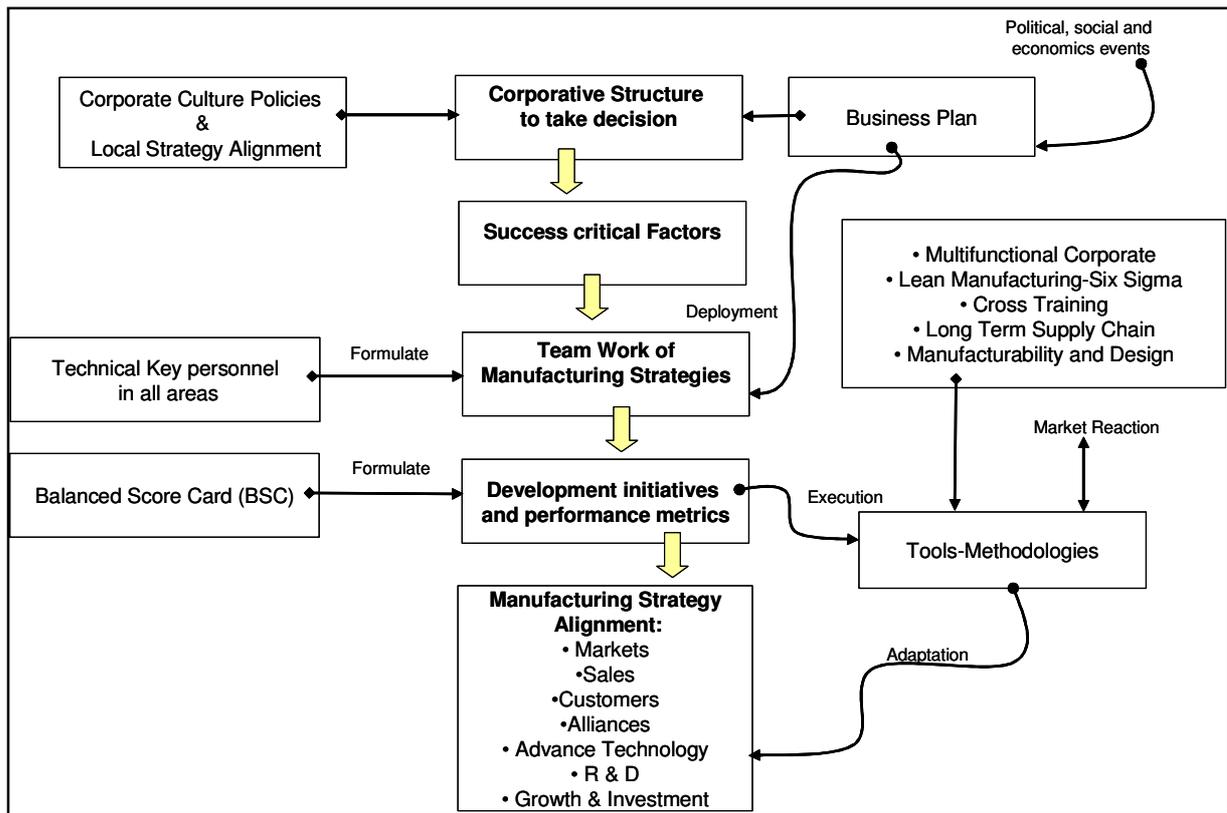
Source: Based in Own production

12. MODEL FOR FORMULATION AND DEPLOYMENT OF MANUFACTURE STRATEGIES

The model proposed for its formulation and deployment for the MS is shown in Figure 7.

Where the Corporate Strategy plays a very important role of this structure and where decisions and politics must be aligned to the Local Strategy. The business plans are part of the Corporate Structure, where the political, social and economic events are included on this. From there, the Success Critical Factors based on the experiences from empiric data obtained, and also to have a benchmarking competitive. The work teams formed by special technical staff from different areas will make the work plan of the MS. A leadership group will be established where the initiatives will be shown and they will determine the performance measurements.

Figure 7 Formulation end deployment of Manufacturing Strategies



Source: Based in Own production.

Within the execution, the work phases are established, which is directed to the manufacturing processes, within the phases of velocity, flood, quality, trust and the environment factors, beside of the human resources.

The specific tools and methodology are also define for its execution, where the organization must react in accordance to the situation of the market to enter an adaptation phase in accordance to the last unfolding of MS, considering important points such as price-marketing, sales, clients, alliances possibilities, the State of the Art in technology for the innovation, development, and also investment for the growth of the company.

13. RELATION PREDICTOR TYPE

In relation to the objectives, the empirical evidence obtained is sufficient to accept that a relation of predicator type exists between the strategy, the operational and financial results; besides this, with the investigation in the plastic industry, the elements of the strategies were determine which correspond to the several stages of the processes for the MS as its influence in the results, and because of the literature reviewed several models were obtained for the MS and the contribution of the elements of the planning system was determine, it is considered that the planned objectives were reached.

In relation to recommendations, it is very urgent to investigate if the planning takes directly to give more training and preparation of the staff personnel, or hiring more qualified personnel, that is the means to form and deployed the projects derived by the plans.

It is also an opportunity to collect more information extending it to other industries and with an extended questionnaire.

14. CONCLUSION

- An appropriate model to structure complex models in accordance to a predictor model, this way it is a planning model with a strategic approach, its analysis is more objective and will represent more realistic conditions.
- Taking decisions will be easier and more effective, which constitutes a competitive advantage.
- Formulate support technology transfers for the realization and operation; obtained effectively in this process.
- It will facilitate the acquisitions of technology by a strategy, company perspective for the best costs and effective competitive operation.
- It will support the systematic planning design and manage the group-firm decisions.
- It will consider the cost of implementation, in reference to training, technologists, and the same administration of the model.

15. FINAL STATEMENT

The human capital will take the foundation of the creation of value. Without undervaluing that the new paradigms in which the investment of the technology, innovation and developing, play a very important role for the development of new products in accordance to the flexibility and agility of the global markets, that is the reason that the company culture must be in accordance to the world class. Measurements of development are the language used in the manufacturing organizations. The following questions and some special fundamentals are important for the developing of the manufacturing organizations:

- Is the expectation reasonable of having new manufacturing technologies may vary with different business strategies?
- The formula of MS place conditions to the companies to accept a more proactive role in the Strategic Planning?
- A pragmatic methodology guide must be emphasized so the firms may help each other to design an MS practicable, and which elements must be considered?
- The investigation must be in infrastructural issues, including Corporate Culture, performance measurements, decision taking and management styles for the implementation of the MS.
- The manufacturing role can be an important element to accomplish competitive superiority.
- The findings give evidence that the manufacturing is slowly failing its image as a “missing link” with the Corporate Strategy.
- It was identified that a great change in the business conditions of the Manufacturing Strategy can be like a catalyzer

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